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A REVIEW OF THE ROCKFISHES OF CALIFORNIA

(Family Scorpaenidae)

By

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JULIUS B. PHILLIPS

A Review of the Rockfishes of California
(Family Scorpaenidae)

INTRODUCTION

The rockfishes and scorpionfishes (family Scorpaenidae) form one of the most important fish families in the ocean waters of California. At present, in California waters, this family is represented by 49 species in the genus *Sebastodes,* two in the genus *Sebastolobus,* and one in the genus *Scorpaena.*

Not only does this family contain more species than any other marine or freshwater fish family known to inhabit our waters, but most of the species are highly desirable for food. Only a few are too small to be of direct value for human consumption. Even these, however, are utilized as food by other fishes, often by larger species of rockfishes. The pygmy rockfish for example, which barely reaches a size of eight inches, has been taken only from the stomachs of other rockfish.

Various rockfishes were of commercial importance in California as early as 1875 and, as a group, the rockfish have continually increased in importance not only in California but along the Pacific Coast, as well. The California catch, which in 1900 totaled between one and two million pounds, has in recent years risen to an average of between 12 and 13 million pounds annually. The importance of rockfish for human consumption during World War II is reflected in the peak Pacific Coast catch of 60 million pounds in 1945.

For many years the majority of the catch was marketed fresh in the form of fillets. At present, only a small amount of the rockfish catch is marketed in a fresh dressed form, particularly in Southern California, but a sizable proportion is processed as frozen fillets. Preliminary tests on the frozen storage life of the fillets of a few important species indicate definite differences in keeping qualities. In this regard, it is hoped that this publication will be of particular value to both the fisherman and the processor in the proper identification of the numerous rockfish species.

In the filleting process of rockfish, there is a loss of about two-thirds from the round weight. The carcasses that remain after filleting are either reduced to meal for livestock feeds or are mixed with scrap fish some of which consists of small unmarketable species of rockfish. This mixture is ground and frozen for use as mink food or as a supplement in the diet of hatchery-raised trout.

During the past decade, sport fishing in the ocean waters of California has become increasingly important as a source of recreation for our growing population, and rockfish are now one of the most important components of the sport catch. Party boat records for all of California reveal that rockfish comprised 9 percent of the two and one-half million fish caught by anglers in 1947. By 1955, 55 percent of the three million fish caught by sport anglers consisted of rockfish.

The adult forms of some rockfish are found only in relatively shallow water, often close to shore, but others are found only in deeper water and the adults of a few may occur in offshore water as deep as 3,000 feet. Surveys being conducted by the California Cooperative Oceanic Fisheries Investigation show that the larvae of various species of rockfish occur in great abundance and are widely distributed along the coast, in some cases appearing as far as 300 miles offshore. They are abundant during most of the months of the year. Thus, during their pelagic existence and later as young and immature forms seeking an ultimate bottom habitat, these species are of considerable importance as food for pelagic, mid-water, and bottom living fishes. The young of various rockfish sometimes form a large and important part of the diet of such highly prized species as king salmon, albacore, and petrale sole.

Most of the Pacific Coast scorpaenids were described prior to 1900 by a number of different workers. These men often based their descriptions on a single specimen, and occasionally a freak or variant would be described as new. Others of these early descriptions are inadequate for satisfactory identification of the fish at hand. As a result, the identity of a number of species of rockfish has been in doubt for many years. A number of recent workers have unraveled some of the nomenclatorial problems and reduced several species to synonymy, however, until now no major attempt has been made to redescribe the different species in the light of current knowledge. The present work presents uniform, concise descriptions of all the species comprising the family Scorpaenidae in California waters. Keys and photographs of all these species are presented to facilitate identification.

Proper identification of the 52 kinds of rockfish, inhabiting our waters, will not only aid the industry by providing means of maintaining a uniformity in its products, but is logically the first step in helping to speed future research studies on this increasingly important group of fishes.

VARIATIONS

One of the difficulties encountered in preparing adequate descriptions of the different species, was obtaining the smaller sizes, particularly those taken in rather deep water. Although the keys resulting from this study are primarily for identification of adult fish, juveniles are included if available. Because of variations it was a difficult problem to incorporate into one key, clear-cut characters that would serve to distinguish both juveniles and adults of all the species. Not only do some of the body proportions change with increasing length of fish, but in some cases there are definite changes in color or markings. In certain species the spines on top of the head, weakly present in the juvenile, are obsolete in the adult. In other species the interorbital space on top of the head is strongly convex in adults, but in juveniles may be essentially flat. Finally, since the different species vary in maximum size from about 8 to 36 inches, it was not always practical to decide whether a small or medium-sized fish was a juvenile or an adult.

Some of the more important changes in body proportions noted in this study were: the length of the head increases at about the same rate as does the length of the fish, with a tendency for the head to grow at

a slightly faster rate in an occasional species; the greatest body depth and the length of the maxillary increase at a faster rate than does the length of the fish; the width of the orbit and the length of the spines in the dorsal and anal fins develop at a slower rate than the length of fish, and, depending upon species, the snout and fin rays grow at a slower or faster rate than the fish.

NOMENCLATURE

The genus *Scorpaena,* described by Artedi in 1738 and incorporated by Linnaeus, in 1758, into his binomial system of classification, was the first to be established for members of the family Scorpaenidae. Although this genus has a number of representatives in warmer waters, there is but a single species, *Scorpaena guttata* on the Pacific Coast north of Mexico.

In 1880, Gill established the genus *Sebastolobus.* The only two species in this genus that are found along the Pacific Coast of North America are *altivelis* and *alascanus.*

The foregoing two well-defined genera have remained unchanged over the years. But the remaining species in the family Scorpaenidae, currently assigned to the genus *Sebastodes,* have previously been assigned to as many as 15 genera. A review of the generic separations proposed by earlier workers for this group, follows:

In 1829, Cuvier established the genus *Sebastes* (rosefishes). For a number of years, this genus included the single species *Sebastes marinus* (Linnaeus), previously known by several synonyms. This is the common scorpaenid of the North Atlantic. Between 1854 and 1861, Ayres described numerous species of rockfish from the Pacific Coast of California, and included all of them under the genus *Sebastes.* In 1861, Gill proposed the genus *Sebastodes* for *Sebastes paucispinis* of Ayres. Ayres accepted *Sebastodes* but redefined it to include *ovalis, flavidus, melanops* and *pinniger.* In 1862, Gill placed all remaining Pacific Coast rockfish that had been discovered up to that time in a new genus *Sebastichthys.*

In 1864, Gill separated the then known rockfishes of the Pacific Coast into four genera: *Sebastodes, Sebastichthys, Sebastomus* and *Sebastosomus.* Jordan and Gilbert (1880) retained *Sebastodes* as a distinct genus but united all the other known species under the genus *Sebastichthys,* retaining *Sebastosomus* as a subgenus. The genera *Sebastodes, Sebastichthys, Sebastosomus and Sebastomus* were united by Jordan and Gilbert, in 1882, under the generic name *Sebastodes,* with the remark, "the species differ greatly in form of armature, but the genera based on these differences intergrade too closely to be worthy of retention."

Jordan (1885) again separated these fishes into two genera *Sebastodes* and *Sebastichthys.* Eigenmann and Beeson, in 1893, revised the rockfishes into eight genera, reinstating the four proposed by Gill in 1864, and adding four of their own: *Acutomentum, Acutospina, Primospina* and *Pteropodus.* The revision was based principally on the condition of the parietal bones of the cranium, and the presence or absence of certain cranial spines. Although Eigenmann and Beeson first published an outline of their revision in the American Naturalist, in 1893, this subject was more fully treated and published in the Proceedings of

the U. S. National Museum, in 1894. The following editor's note accompanied the 1894 publication, "The classification adopted by the authors of this paper is based on their own peculiar interpretation of the importance of certain structural characters. The arrangement and nomenclature proposed will not be, at the present at least, followed in the National Museum."

Cramer (1895) published an account of the cranial characters of 32 species of *Sebastodes*. He discounted the generic separations proposed by Eigenmann and Beeson, based on their "primary character" which was the "union or non-union of the parietals." Cramer found this character quite variable and not correlated with a single other important character. He consolidated previous generic separations into the single genus *Sebastodes* Gill, 1861.

Jordan and Evermann (1898) also consolidated the various species of "rock cods" into one genus *Sebastodes* Gill 1861, but indicated natural groupings of species by a number of subgenera. The genera listed by Eigenmann and Beeson (1893) were reduced to subgenera, and in addition the subgenera *Rosicola, Eosebastes, Hispaniscus* and *Zalopyr* were proposed. *Sebastodes glaucus,* reported from the Bering Sea, and typically provided with 14 dorsal fin spines instead of 13 as in the remaining species of *Sebastodes,* was placed in the subgenus *Emmelas.*

Jordan, Evermann, and Clark (1928) elevated to generic rank the subgenera of Jordan and Evermann (1898), and proposed still another two genera, *Sebastopyr* and *Sebastocarus.* They retained *Primospina* as a subgenus. However, this and other previous generic separations have proven rather ill-defined and most recent fisheries workers have continued to place all of our Pacific Coast rockfish, with 13 dorsal fin spines, in the single genus *Sebastodes.*

Currently, some fisheries workers claim that there are insufficient grounds for the existence of the genus *Sebastodes,* and that all the species assigned to this genus should revert to the genus *Sebastes* Cuvier, 1829. Pending further clarification of this issue, *Sebastodes* is maintained in the present study. Therefore, the members of the family Scorpaenidae that occur in Californian waters are treated in three genera: *Scorpaena, Sebastodes,* and *Sebastolobus.*

A number of species of *Sebastodes* have been described that proved to be synonyms of previously described species. Hubbs and Follett (MS) list the species of *Sebastodes* found along the Pacific Coast of North America that are now considered valid, as well as those that appear to be synonyms. The scientific nomenclature in this present study is based upon the findings of Hubbs and Follett.

For the sake of clarity, some of the recent changes in the status of certain species reported for Californian waters are as follows:

Species	*Synonym*
S. ovalis	*S. rufus* Eigenmann & Eigenmann
S. miniatus	*S. eigenmanni* Cramer
S. atrovirens	*S. atrorubens* (Gilbert)
S. aleutianus	*S. introniger* (Gilbert)
S. rosaceus	*S. ayresi* Gilbert & Cramer
S. melanostomus	*S. rupestris* (Gilbert)
S. dalli	*S. gilberti* Cramer
S. caurinus	*S. litoris* Hubbs & Schultz

Most of the rockfish occurring in Californian waters can be separated from one another by certain well-defined characters. However, a few species are quite similar in many respects and require a close appraisal of certain characters to identify them properly. In particular, the following four pairs of species belonging to the genus *Sebastodes* are quite similar: *chlorostictus* and *eos; caurinus* and *vexillaris; rosaceus* and *helvomaculatus;* and *carnatus* and *chrysomelas.*

Usually, *S. chlorostictus* can be separated from *S. eos* by the absence of scales on the underside of the mandible. But in an occasional specimen of *S. eos* the scales on the mandible may be reduced to a small patch, thus placing it in one of the same subsections of the key as *S. chlorostictus.* In this case, a separation between the two is made on the basis of orbit width into length of the ventral fin spine, and the presence or absence of scales on the branchiostegals.

At one time, *S. caurinus* and *S. vexillaris* were considered nonoverlapping in their distribution, with the former species presumably found only to the northward of California and the latter along the California coast, southward into Baja California. In recent years, the range of *S. caurinus* has been extended southward to at least Monterey Bay. Although these two species are similar, for similar-sized fish the orbit width of *S. caurinus* is noticeably less than that of *S. vexillaris.* The separation is apparent in Figure 1, in which the frequency of orbit width into standard length is plotted against standard length for the two species. On the basis of this separation, a secondary character, the frequency of the orbit width into the length of the ventral fin spine, is used in the key.

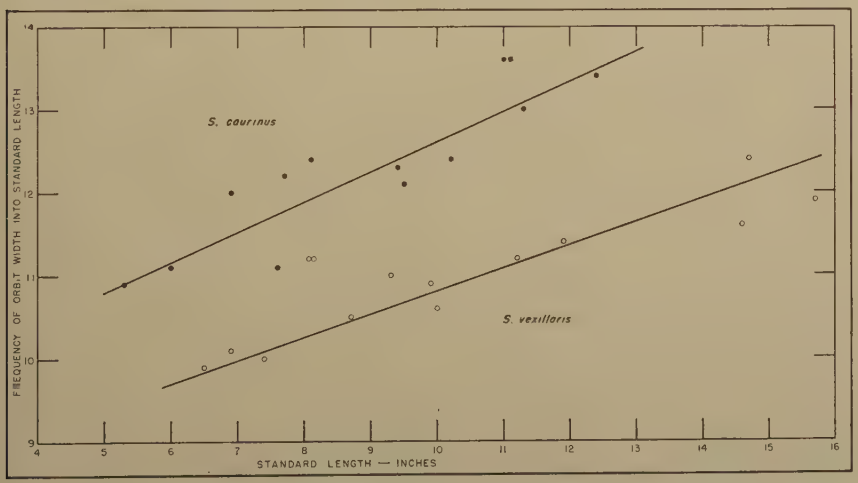

FIGURE 1. Frequency of orbit width into standard length plotted against standard length for the two species *Sebastodes caurinus* and *Sebastodes vexillaris.*

The same procedure used in separating *caurinus* and *vexillaris* was used in ascertaining the extent, if any, of separation between the two similar species *rosaceus* and *helvomaculatus.* There is a noticeable color difference between the two forms, and when the frequency of the orbit

width into standard length is plotted against standard length (Figure 2), a separation between the two is apparent. On the basis of this separation, it was possible to find three secondary key characters by which the two could be distinguished: frequency of orbit width into longest dorsal fin spine; into length of upper jaw; and into greatest body depth.

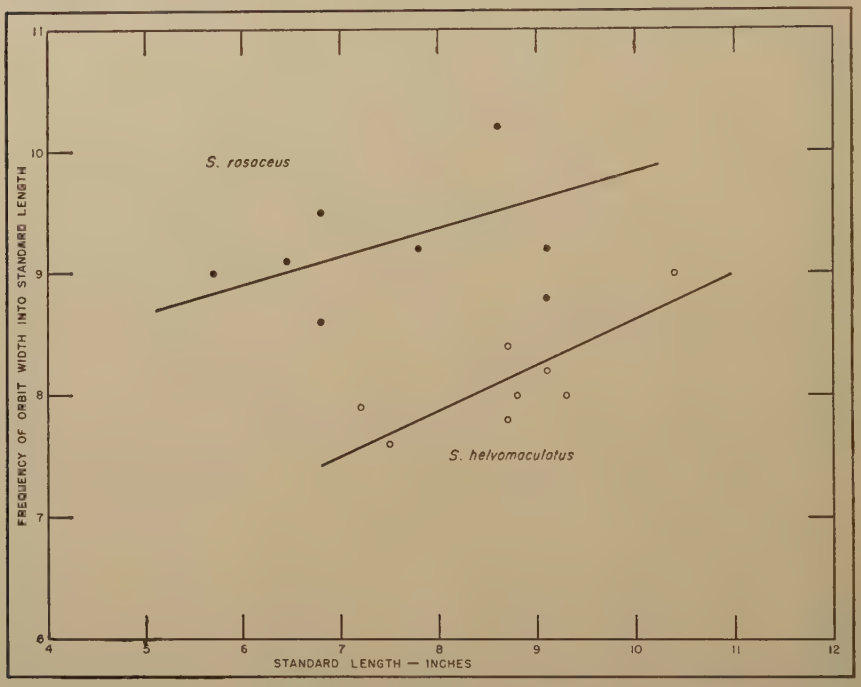

FIGURE 2. Frequency of orbit width into standard length, plotted against standard length for the two species *Sebastodes rosaceus* and *Sebastodes helvomaculatus*.

Hubbs and Schultz (1933) pointed out that the two species, *carnatus* and *chrysomelas* may prove to be only subspecifically distinct. Both of these forms are taken in comparatively shallow water, 150 feet or less, with the latter more abundant close to rocky shores and the former more abundant in deeper water. In the present study, no characters were found that would adequately separate these two, except that of body color in most instances. Both are mottled with dark and light colors on the body, the pattern remaining the same for both forms. In *carnatus* the dark color is oliveaceous and the light color a light gray or pink; whereas in *chrysomelas* the dark color is blackish and the light color yellow. It is not unlikely that the two are simply extreme variations of the same species, but pending the results of further studies on a larger series from different regions along the coast, it seems prudent to continue to maintain these two as distinct species.

DEFINITIONS OF MEASUREMENTS AND COUNTS

Measurements were made in a straight line between selected points and recorded to the nearest one-tenth of a millimeter. Long measurements were made with a meter-stick type caliper consisting of one fixed arm and one sliding arm. Short measurements were made with a pair of dividers. None of the measurements involved dissection.

Interorbital Space Convexity, Flatness, or Concavity—Determination is made from the tops of the ocular ridges at mid-orbits, paying particular attention to the median portion of cranium. In a few specimens the median portion of cranium may be elevated but still slightly below the tops of the ocular ridges. This condition is considered as a concavity. In many cases, it may be desirable to place a straight edge across the tops of the ocular ridges.

Standard Length—From the median point at anterior tip of upper lip to the end of the hypural, or terminus of vertebral column. The latter point is determined by bending the caudal fin sidewise at a sharp angle, noting the crease thus formed.

Head Length—From the median point at anterior tip of upper lip to the posterior fleshy margin of the opercular flap.

Snout Length—From the median point at anterior tip of upper lip to the anterior bony margin of orbit.

Orbit Width—The horizontal distance between the inside margins of the bony ring that surrounds the eye. In larger specimens of some species, a marked notch appears at the anterior margin of the orbit. In such cases, the point of the divider should be placed deeply enough in the eye socket so as to reduce the extent of this irregularity.

Width of Interorbital Space (Interorbital Width)—The narrowest, transverse bony width between orbits, at top of head.

Least Width of Suborbital Bone—The least vertical distance between lower rim of orbit and edge of fleshy escarpment against which fits the upper edge of maxillary.

Length of Upper Jaw—From the median point at anterior tip of upper lip to tip of expanded portion of maxillary.

Amount That Lower Jaw Projects—The horizontal distance between anterior tip of upper lip and tip of lower jaw, with jaws closed.

Depth of Caudal Peduncle—Vertical measurement at narrowest point.

Ventral Length of Caudal Peduncle—From posterior base of last anal fin ray to lateral line, at terminus of vertebral column.

Dorsal Length of Caudal Peduncle—From posterior base of last dorsal fin ray to lateral line, at terminus of vertebral column.

Length of Base of Anal Fin—From anterior base of first anal fin spine to posterior base of last anal fin ray, excluding any membrane following the last ray.

Width of Base of Pectoral Fin—The distance between the outside margins at bases of first and last rays.

Longest Pectoral Fin Ray—Measured from a straight line between insertions of first and last rays, to end of longest ray.

Longest Ventral Fin Ray—Measured from base on inside of fin, to tip of longest ray.

Length of Ventral Fin Spine—Measured from base, which is indicated by a crease when spine is moved outward, to tip of spine.

Longest Dorsal Fin and Anal Fin Spine—The lengths of these spines are measured from the point at which their anterior bases enter the flesh, to the tips.

Last Dorsal or Anal Fin Ray—The last dorsal or anal fin ray is counted as one unless it is apparent that the subdermal portion of the posterior element would not be in contact with the previous element.

Number of Rakers on First Gill Arch—All the visible rakers including any nubs at the ends of the arch are counted. (In small specimens it may be necessary to free the lower attachment of the arch, for a better view.)

Number of Pores Along Lateral Line—Counted to the terminus of the vertebral column, excluding the usual one or two pores beyond the crease formed by bending the tail sidewise.

Presence or Absence of Spines on Posterior Edge of Gill Cover (Opposite Preopercular Spines)—Reference is made to spines that may be present at the juncture of the lower corner of opercle and the upper corner of the interopercle.

Diagonal Rows of Scales Below Lateral Line—The anterior most diagonal row of scales below the lateral line is usually obscured by the

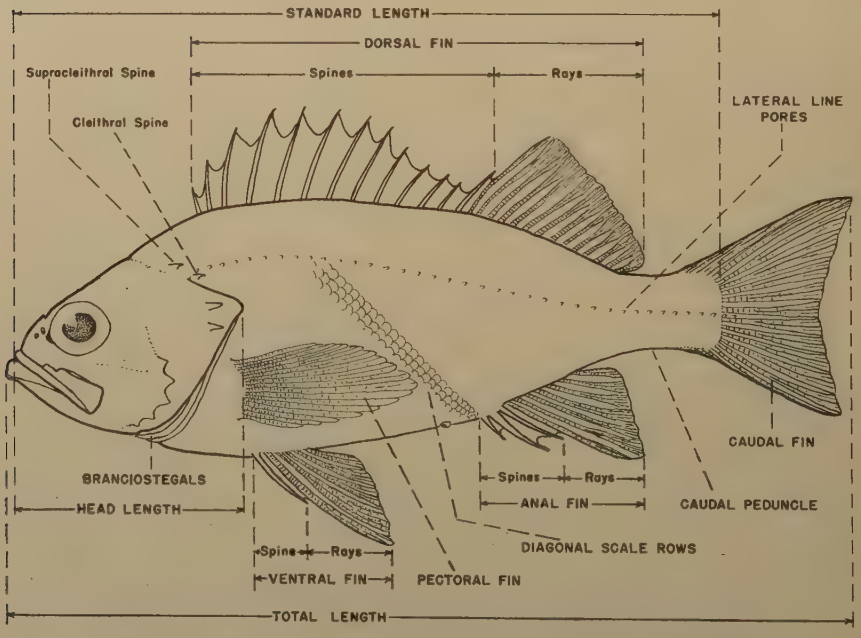

Figure 3. Side view of a typical rockfish of the genus *Sebastodes*.

edge of the gill cover. The count of rows is continued posteriorly to the end of the vertebral column. In some species the larger specimens may have numerous small, accessory scales interspersed among the regular series of larger scales. These accessory scales are not counted.

Figures 3, 4, and 5 illustrate the various features in the genus *Sebastodes* referred to in this study. The spines illustrated in Figure 5 are collectively present in only a few rockfish. In those species that bear spines on top of the head, often the coronal, nuchal or supraoculars are absent. The presence or absence of the coronal or nuchal spines is readitly ascertained because of their location. The presence or absence of the supraocular spine, because of its proximity to the postocular may be a little more difficult to ascertain. However, when it appears that one of these spines over the posterior one-half of the orbit is absent, invariably it is the supraocular spine and should be taken as such for key purposes (Cramer, 1895). Infrequently, the tympanic may be quite small or absent, but this spine ordinarily occurs above and slightly behind the posterior rim of the orbit. The latter spine is not treated as a primary key-character.

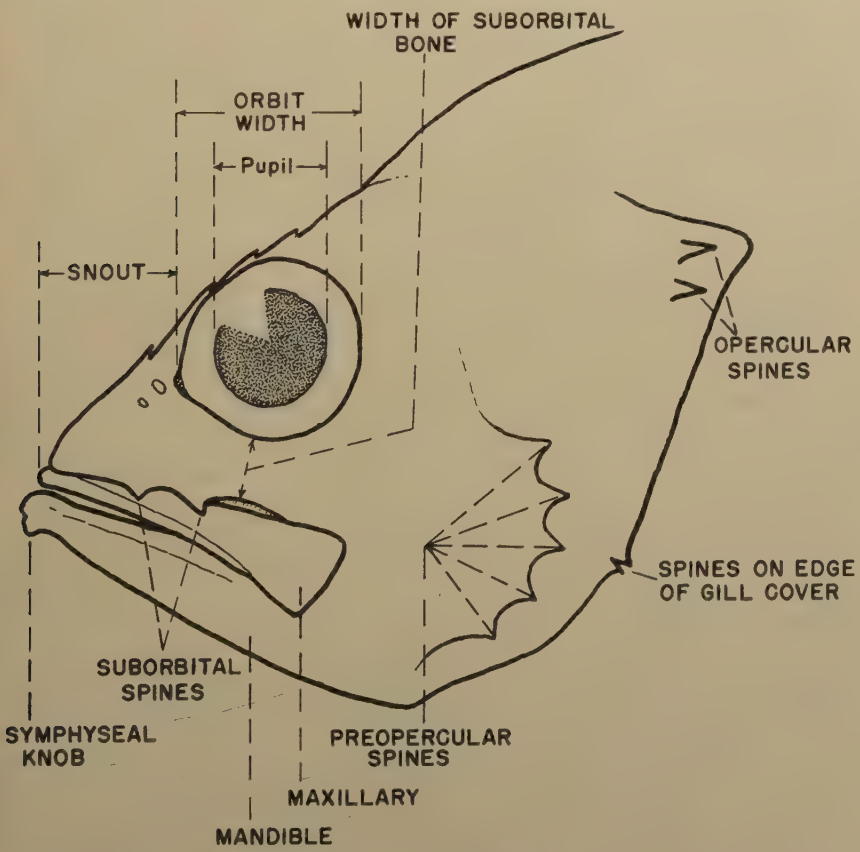

FIGURE 4. View of side of head of a rockfish of the genus *Sebastodes*.

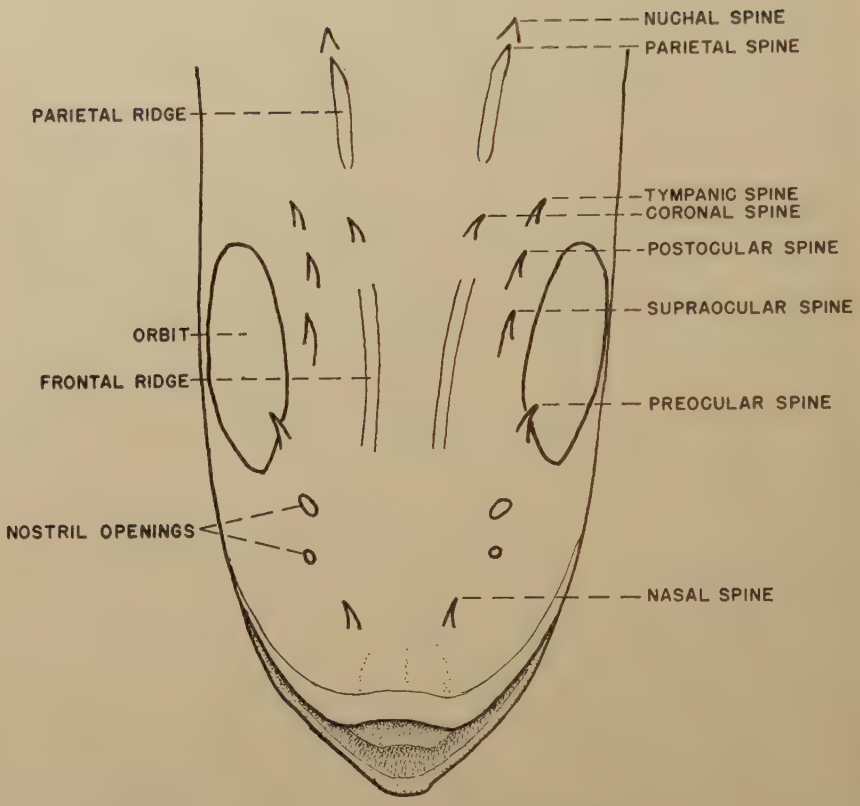

FIGURE 5. View of top of head of a rockfish illustrating the location of the spines and ridges.

The names herein given for the different parts of a fish, including the designation of certain spines, are in accord with general usage by fishery workers along the Pacific Coast, except in the following cases:

Name of part or spine	
Current study	*Synonym*
Ventral fin	Pelvic fin
Preocular spine	Prefrontal spine
Supraocular spine	Frontal I spine
Postocular spine	Frontal II spine
Tympanic spine	Frontal III spine
Coronal spine	Median frontal spine
Parietal spine	Parietal I spine; occipital spine
Nuchal spine	Parietal II spine
Suborbital spines	Lacrymal spines
Cleithral spine	Suprascapular spine; humeral spine
Supracleithral spine	Suprascapular spine; humeral spine

FAMILY SCORPAENIDAE—ROCKFISHES AND SCORPIONFISHES

The family Scorpaenidae, which in California includes the thornheads or "idiots," the rockfishes or "rock-cods," and the scorpionfish or sculpin is grouped with several other families of fishes in the order Scleroparei or mail-cheeked fishes. This order is characterized by the presence of a bony stay, a posterior elongation of the suborbital series of bones, that terminates on the preopercle. In some instances the bony stay is outwardly evident but usually its presence and form cannot be determined without probing. In addition, the fishes in the order Scleroparei have the ventral (pelvic) fins thoracic in position, that is, these fins are inserted on the breast about under the pectoral fins; each of the paired, ventral fins consists of a single spine and five fin rays.

The family Scorpaenidae is separated from the other families in the order Scleroparei by the following characters: gill openings that extend to at least the lowest pectoral fin ray; the slit behind the fourth gill arch absent or reduced to a pore; a uniformly scaly body; two spines on the upper posterior corner of the opercle; and five short, strong spines on the posterior margin of the preopercle. In some species the lowermost one or two preopercular spines may be greatly reduced.

In the rockfishes and the scorpionfish the body is elongate and stout, usually somewhat compressed laterally; head large; mouth terminal, with the lower jaw projecting in some species, not projecting in others; teeth present in both jaws, on the vomer, and on the palatine bones; premaxillaries protractile; maxillary broad, without supplemental bones; gill openings wide, with the gill membranes separate from the isthmus; and an exposed pseudobranchial arch attached to the inner face of the opercle.

KEY TO GENERA OF SCORPAENIDAE

1a—Dorsal fin spines 15 or 16, rarely 17; dorsal fin rays 8-10; vertebrae 29. *Sebastolobus*

1b—Dorsal fin spines 13, rarely 11, 12, or 14; dorsal fin rays 11-18; vertebrae 26 or 27. *Sebastodes*

1c—Dorsal fin spines 12; dorsal fin rays 9 or 10, rarely 8; vertebrae 24. *Scorpaena*

GENUS *SEBASTOLOBUS* (THORNHEADS OR IDIOTS)

The two species in this genus, *alascanus* and *altivelis* are found in rather deep water from Baja California to Alaska. Specimens have been taken at depths reported as ranging from 300 to about 4,800 feet. *S. altivelis*, the smaller of the two, is taken in deeper water than is *S. alascanus*.

General Description

The interorbital space, on top of the head, is strongly and sharply concave. The head has a series of thin but strong spiny ridges: a paired series on top commences with the nasal spine, followed by the preocular, supraocular, postocular, and tympanic close to each orbit, and terminates with the paired parietal and nuchal spines, on the nape, the latter two spines of nearly equal length. A short ridge composed of about three spines is present on each upper side of the head; this ridge commences at the posterior rim of the orbit and extends backward on

a level with the upper margin of the pupil. Following this, at the anterior end of the lateral line, there is a triangular cleithral spine, and anterior to and above this, the similar supracleithral spine. Several small spines may border the posterior rim of each orbit. A thin ridge, composed of about five spines is present just below the lower rim of each orbit; this ridge commences anterior to the orbit and extends backward, so that the last spine is superimposed upon the base of the uppermost preopercular spine. Two spines are usually present on the lower anterior margin of the suborbital.

Head length is contained 2.2-2.5 times in standard length; greatest body depth 3.4-4.3 in standard length; orbit width 2.8-3.7 in head length, 0.6-0.9 in snout length, or 0.2-0.4 in interorbital space. The lower jaw is slightly included, with a sharp downward-projecting symphyseal knob. Dorsal fin rays 8-10; anal fin rays 4-6; pectoral fin rays 20-24, the lower rays forming a short lobe.

Scales moderately large on the body, with numerous small accessory scales in larger individuals. The head including interorbital space is scaled and there are scales on all fins. In addition, there are small scales around the margin of the membrane that covers the eye, particularly in larger individuals. The body color is red, and there is usually a black blotch on the dorsal fin and often some black on the distal margins of the other fins.

Key to the Species of *Sebastolobus*

1a—Dorsal fin spines 16, occasionally 15, rarely 17.
Branchiostegals without scales.
Fourth or fifth dorsal fin spine the longest.
Lining of gill cavity light in color, but often with a dusky splotch on inside of opercle.
(24″) *ALASCANUS* (page 36)

1b—Dorsal fin spines 15, occasionally 16.
Branchiostegals usually with scales, occasionally without scales.
Third dorsal fin spine usually the longest, rarely the fourth spine is longer.
Lining of gill cavity dark gray or black.
(15″) *ALTIVELIS* (page 34)

GENUS *SEBASTODES* (ROCKFISH OR ROCK COD)

Approximately 55 species belonging to the genus *Sebastodes* occur along the Pacific Coast of North America from Baja California northward to Alaska. Only a relatively few are distributed over this entire range, which encompasses about 1,800 miles of coastline. Groups of species are found at various depths from tide-water to a reported 3,000 feet, but the greatest number is found at depths less than 1,500 feet. Some species occur only in the inshore zone, out to about 150 feet, around rocks and kelp while at the other extreme, some as adults are taken only offshore and in deep water. The young of a number of species, that as adults inhabit deep water, are often found in comparatively shallow inshore waters. These gradually move into deeper water

with increasing age. A few species are quite small, hardly reaching 10 inches in length when full grown, whereas a few others are relatively large, attaining a length of 36 inches. The greatest number of species occurs in the size range of 12 to 25 inches, when full grown. For the most part, rockfish are found off rocky coasts or over a rocky or gravelly bottom, but a few occur over a hard sandy bottom. At present 49 rockfish are recognized from Californian waters.

General Description

In different species the interorbital space on top of the head varies from strongly convex (elevated) to strongly concave (depressed). In some, wherein the top of head is strongly convex, ridges and spines are frequently absent (obsolete) except for occasional weak parietal ridges or weak nasal spines. In others in which the top of head is moderately convex, weak to strong spines are sometimes present, above and following each orbit, with moderately strong parietal ridges and sometimes with low frontal ridges. In species wherein the top of the head is concave, the ridges and spines on top of head are usually quite strong. In a few a full complement of spines: nasal, preocular, supraocular, postocular, tympanic, coronal, parietal and nuchal may be present on top of head. The coronal and nuchal spines are not present in most species, while the supraoculars may be present in some and absent in others. The strong spiny ridges on the side of the head, as described for the two species of *Sebastolobus* are absent. However, small spines may be present on the lower margin of the suborbital bone, or on the posterior edge of the gill cover, and small spines may be present at the lower rim of the orbit in *Sebastodes aleutianus*.

Head length is contained 2.2-3.2 times in standard length; greatest body depth 2.3-4.1 in standard length; orbit width 2.9-5.7 in head length, 0.7-1.7 in snout length, or 0.5-1.4 in interorbital space. The lower jaw may or may not be projecting, with or without a symphyseal knob. Dorsal fin rays 11-17; anal rays 5-10; pectoral fin 16-21 rays, its profile rather rounded with the middle rays longest.

The body scales are moderately large in most species, with small accessory scales present in some. The head, including the interorbital space is scaled and there are scales on the fins, except that the spinous dorsal may have very few in some species. Except in the adult of one species *S. aleutianus* there are no scales around the margin of the membrane that covers the eye. The body color varies greatly and may be light-pink, red, dark green, nearly black, mottled, blotched, barred, striped, or spotted. Rockfish that are found inshore, around rocks and kelp, usually have a darker coloration than do those that are found in deeper water. In the latter case the predominant color is often pink or red.

Key to the Species of *Sebastodes*

In this key, opposing characters are indicated by consecutively numbered pairs of the letters "a" and "b," starting with 1a and 1b. If "a" is true, then "b" is false, and vice versa. Continue from one true statement to another until, following the last true statement, the specific scientific name is given. A number of species names are followed by an asterisk (*). This indicates that because of variations in certain char-

acters the species is also to be found in another section of the key. Preceding a species name, the maximum known length is shown in parentheses. Where a species occurs more than once, the maximum length and the general color is not repeated, but reference is made to the first numbered section where such information can be found.

It should be noted that if the series of ocular spines that occur above the eye is incomplete, it is the supraocular that is invariably absent. (Cramer 1895.)

To determine the presence of spines on top of head (Sections 3a and 3b), it may be necessary to use a magnifier or the edge of a sharp instrument such as a knife.

1a—Interorbital space at mid-orbits strongly convex (elevated) to flat, not concave.

2a—Rear of anus situated well in advance of origin of anal fin, 1.1-1.5 orbit width from anal fin. Color pink, light-dusky on back.

(11″) *JORDANI* (page 38)

2b—Rear of anus situated close to origin of anal fin, within 0.1-0.8 orbit width from anal fin.

3a—Most of spines on top of head obsolete or nearly so. Weak nasal and preocular spines may be present in some species but the remaining spines are irregularly or not at all present, except in juvenile stage in some species.

4a—Tip of second anal fin spine extends beyond tip of third anal fin spine by about 0.2 orbit width (spines depressed). Color dusky-tan with several angular dark-brown blotches on back.

(11″) *HOPKINSI* * (page 50)

4b—Tip of second anal fin spine does not extend beyond tip of third anal fin spine (spines depressed); in some cases 0.5 orbit width, less.

5a—End of maxillary extends to below rear of pupil or rear of orbit.

6a—Orbit width 1.3-1.6 in length of snout, 2.3-2.9 in length of upper jaw.

7a—Anal fin rays 9, occasionally 10, pectoral fin rays 15 or 16, lateral line pores 54-58. Color pink with dusky upper parts.

(36″) *PAUCISPINIS* (page 40)

7b—Anal fin rays 7, pectoral fin rays 17 or 18, lateral line pores 44-49. Color dark-gray dorsally becoming silver-gray on sides.

(28″) *BREVISPINIS* (page 42)

6b—Orbit width 0.9-1.3 in length of snout, 1.7-2.2 in length of upper jaw.

8a—Orbit width 3.5-4.1 in length of pectoral fin, least interorbital width 3.2-3.5 in head; peritoneum blackish except that some large specimens may have peritoneum nearly white. Color blue-black; young, dusky with irregular brownish streaks.

(21″) *MYSTINUS* * (page 52)

8b—Orbit width 2.6-3.2 in length of pectoral fin, least interorbital width 3.7-4.4 in head; peritoneum silvery-white.

9a—Diagonal rows of scales below lateral line 50-55; terminal profile of anal fin (first to last rays) rounded but usually with the greater length of profile slanted anteriorly. Color black above, mottled with gray on sides; vague black spots on base of dorsal fin in larger specimens.

(20″) *MELANOPS* * (page 54)

9b—Diagonal rows of scales below lateral line 55-66; terminal profile of anal fin (first to last rays) nearly vertical or with slight posterior slant. Color grayish-brown or olive-aceous with some gray blotches on back; spots absent on base of dorsal fin.

10a—Anal fin rays 8, occasionally 7 or 9; a slight symphyseal knob present; tips of lower pectoral fin rays tinged with pink. Color grayish-brown, the sides finely stippled with brown. (26″) *FLAVIDUS* (page 56)

10b—Anal fin rays 9 or 10, rarely 8, symphyseal knob usually absent; tips of lower pectoral fin rays not tinged with pink. Color olive-gray, the sides finely stippled with dark-gray. (20″) *SERRANOIDES* (page 58)

5b—End of maxillary extends to below mid-orbit, or slightly less.

11a—Orbit width 0.6-0.8 in length of second anal fin spine; second anal spine 5.1-6.4 in head; anal fin base 7.0-8.1 in standard length. Color, pinkish-red. (22″) *GOODEI* (page 44)

11b—Orbit width 1.0-1.7 in length of second anal fin spine; second anal spine 2.3-4.5 in head; anal fin base 5.4-6.9 in standard length.

12a—Two triangular spines on lower edge of suborbital bone, the anterior spine sometimes bifid; second anal fin spine usually twice as thick as third anal fin spine. Color tawny, spotted or mottled with darker color. (22″) *OVALIS* * (page 48)

12b—Spines absent on lower edge of suborbital bone; second anal fin spine not twice as thick as third anal fin spine.

13a—Interorbital space 3.9-4.4 in head; length of upper jaw 2.0-2.1 in head; terminal profile of anal fin (first to last ray) rounded or with greater portion slanted anteriorly; peritoneum silvery-white. Color (9a). *MELANOPS* * (page 54)

13b—Interorbital space 3.2-3.9 in head; length of upper jaw 2.3-2.5 in head; terminal profile of anal fin (first to last ray) vertical or slanted posteriorly; peritoneum blackish, except in occasional large specimens of *mystinus*.

14a—Least depth of caudal peduncle 8.9-9.6 in standard length; longest anal fin ray 5.8-6.4 in standard length; ends of lower pectoral fin rays blue. Color (8a). *MYSTINUS* * (Page 52)

14b—Least depth of caudal peduncle 10.5-11.9 in standard length; longest anal fin ray 6.8-7.4 in standard length; ends of lower pectoral fin rays gray or tinged with pink. Color grayish-brown. (20″) *ENTOMELAS* (page 46)

3b—Spines developed on top of head but these not strong in all species. Upon close inspection, at least all of the following paired spines should be present: nasal, preocular, postocular, tympanic and parietal. In addition, some species may have any or all of the following spines: supraocular, nuchal and coronal.

15a—Supraocular spines absent.

16a—Coronal spines absent.

17a—Nuchal spines absent.

18a—Rakers on first gill arch short and flat, about as high as wide but not more than two times high as wide; total number 22-25. Color blackish-green with paler mottling. (16″) *RASTRELLIGER* (page 72)

18b—Rakers on first gill arch long and perhaps flattened but 3 to 6 times high as wide; total number 25-44.

19a—Anterior ends of premaxillaries project forward of snout as prominent dentigerous knobs (the tip of the lower jaw fits into the concavity between the knobs). Color uniformly light-red. (14″) *DIPLOPROA* * (page 86)

19b—Anterior ends of premaxillaries do not project forward as prominent dentigerous knobs.

20a—Underside of mandible covered with scales.

21a—Orbit width 2.0-2.6 in longest anal fin ray; posterior profiles of caudal and anal fins, rounded (convex); peritoneum silvery-white. Color olive-gray to olive-brown, vaguely mottled with darker brown.

(15″) *ATROVIRENS* (page 70)

21b—Orbit width 1.3-1.8 in longest anal fin ray; posterior profile of caudal fin indented (concave) or truncate, profile of anal fin (first to last ray) vertical or slanted posteriorly; peritoneum gray to black.

22a—Orbit width 10.7-12.6 in standard length; least width of interorbital space 3.4-4.5 in head.

23a—Rakers on first gill arch 38-43; spines present on posterior margin of gill cover opposite preopercular spines. Color light-red mottled with olive, dorsally. (24″) *PRORIGER* (page 68)

23b—Rakers on first gill arch 31-39; spines absent on posterior margin of gill cover (rarely, a spine may be present on one side).

24a—Anal fin base 5.4-6.7 in standard length; tip of second anal fin spine extends a little beyond tip of third anal fin spine (spines depressed); anal fin rays 8 or 9, occasionally 7. Color (12a).

OVALIS * (page 48)

24b—Anal fin base 7.1-7.7 in standard length; tip of second anal fin spine a little less than tip of third anal fin spine (spines depressed); anal fin rays 7, occasionally 6. Color (4a).

HOPKINSI * (page 50)

22b—Orbit width 7.4-10.1 in standard length; least width of interorbital space 4.5-5.6 in head.

25a—Tip of second anal fin spine fails to reach tip of third anal fin spine by 0.1-0.2 orbit width (spines depressed); second anal fin spine 8.3-10.8 in standard length. Color pink, usually with an elongate dusky blotch at base of soft dorsal fin; other vague dusky areas sometimes present.

(20″) *ALUTUS* * (page 78)

25b—Tip of second anal fin spine projects 0.1-0.3 orbit width beyond tip of third anal fin spine (spines depressed); second anal fin spine 4.5-6.6 in standard length.

26a—Rakers on first gill arch 31-37; greatest body depth 2.7-3.2 in standard length.

27a—Pectoral fin rays 17, occasionally 18, unbranched rays 8 or 9, thickened; spines absent on posterior margin of gill cover opposite preopercular spines. Color pink with irregular dark blotches on back, an elongate black blotch on gill cover.

(13″) *ZACENTRUS* * (page 102)

27b—Pectoral fin rays 16, occasionally 14, 15 or 17, unbranched rays 6 or 7, not thickened; spines present on posterior margin of gill cover. Color yellow-pink with several vague dusky blotches on back; greenish streaks on caudal fin, at least on upper portion.

(13″) *SAXICOLA* * (page 80)

26b—Rakers on first gill arch 37-43; greatest body depth 3.4-3.7 in standard length.

28a—Anal fin rays 6; triangular spines absent on lower edge of suborbital bone. Color light-brown flushed with red; dark blotches along back and brownish stripe below lateral line.

(7½″) *WILSONI* * (page 100)

28b—Anal fin rays 7 or 8; two triangular spines present on lower edge of suborbital bone. Color dusky-pink above and silvery-pink below; two conspicuous dark red bars on posterior section of body; brownish streaks on caudal fin.

(10″) *SEMICINCTUS* (page 76)

20b—Underside of mandible naked, or only with patches of scales.

29a—Symphyseal knob absent; pores in lateral line 35-38. Color slaty-brown, splashed with yellow on anterior portion of body; small orange-brown spots on lower, anterior portion of body.

(24″) *MALIGER* * (page 94)

29b—Symphyseal knob present; pores in lateral line 39-47.

30a—Spines absent at posterior margin of gill cover opposite the preopercular spines; preopercular spines single, sharp, the upper two usually longer and directed backward, the lower three often directed rather downward; red bands on sides. Color light-pink with several dark red bars across sides (these pale in very large specimens).

(36″) *RUBRIVINCTUS* * (page 92)

30b—Spines present at posterior margin of gill cover opposite preopercular spines; preopercular spines short and blunt, some of spines multifid in larger specimens; no red bands on sides.

31a—Orbit width 1.6-1.8 in length of ventral fin spine. Color dark-brown or olive-brown, washed with copper-pink and occasionally splashed with yellow; rear two-thirds of lateral line in a clear zone. (See Fig. 4.)

(20″) *CAURINUS* * (page 96)

31b—Orbit width 1.3-1.5 in length of ventral fin spine. Color pale yellowish to oliveaceous-pink, these colors forming large, irregular areas (occasional specimens may have the rear two-thirds of lateral line in a clear zone, as in *S. caurinus*).

(See Fig. 4.) (20″) *VEXILLARIS* * (page 98)

17b—Nuchal spines present.

32a—(Same as section 30a) *RUBRIVINCTUS* * (page 92)

32b—(Same as section 30b)

33a—(Same as section 31a) *CAURINUS* * (page 96)

33b—(Same as section 31b) *VEXILLARIS* * (page 98)

16b—Coronal spines present. Nuchal spines present or absent. Color light-brown, irregularly mottled with dark-brown.

(18″) *AURICULATUS* (page 74)

15b—Supraocular spines present.

34a—Coronal spines absent.

35a—Nuchal spines absent.

36a—Mandible covered with scales.

37a—Tip of second anal fin spine extends beyond tip of third anal fin spine about 0.2 orbit width (spines depressed). Color (4a). *HOPKINSI* * (page 50)

37b—Tip of second anal fin spine does not extend beyond tip of third anal fin spine, usually 0.1-0.2 orbit width less.

38a—Terminal profile of anal fin (from first to last rays) slanted anteriorly; peritoneum silvery-white (small fish under six inches long may have black dots on the silvery peritoneum).

39a—Scales on underside of mandible rough, when rubbed forward; both of the triangular suborbital spines strong, the rear one sometimes double; rakers on first gill arch 35-42. Color dark-red mottled with gray; fins red (tipped with black in young).

(30″) *MINIATUS* * (page 62)

39b—Scales on underside of mandible smooth, when rubbed forward; the anterior of the two suborbital spines weak or a small lobe; rakers on first gill arch 41-45. Color gray mottled with orange; fins orange (a black blotch between 7th and 11th dorsal fin spines, in young specimens). (30″) *PINNIGER* (page 60)

38b—Terminal profile of anal fin (from first to last ray) nearly vertical or slanted posteriorly; peritoneum dark gray with black dots to black.

40a—Least interorbital width 4.6-4.9 in head; symphyseal knob strong, distinctly forward-projecting; usually but one triangular spine on lower edge of suborbital bone. Color (25a). *ALUTUS* * (page 78)

40b—Least interorbital width 3.4-4.3 in head; symphyseal knob moderate to strong, downward-projecting or indistinctly forward-projecting, as a thickening of tip of lower jaw.

41a—Anal fin rays 8 or 9, occasionally 7; terminal profile of anal fin with a strong posterior slant from first to last ray; no distinct black blotches on back.

42a—Two sharply triangular spines (one sometimes bifid) present on lower margin of suborbital bone; dark spotting present on body. Color (12a). *OVALIS* * (page 48)

42b—Spines absent on lower margin of suborbital bone; spotting absent on body. Color (14b).

ENTOMELAS * (page 46)

41b—Anal fin rays 7; terminal profile of anal fin vertical or slightly rounded. Color pink with four or five black blotches on back. (20″) *CRAMERI* * (page 66)

36b—Mandible naked, or with patches of scales.

43a—Orbit width 0.5-0.7 in least width of suborbital bone; pores along lateral line 45-52. Color light red; specimens under about 16 inches length with vague dusky bars and often with dark red blotches. (36″) *LEVIS* (page 64)

43b—Orbit width 0.3 in least width of suborbital bone; pores along lateral line 35-38. Color (29a).

MALIGER * (page 94)

35b—Nuchal spines present.

44a—Pores in lateral line 27-34.

45a—Rakers on first gill arch 29-35; anal fin rays 7 or 8, occasionally 6; orbit width 0.8-1.3 in length of second anal fin spine.

46a—Head length 2.2-2.4 in standard length; orbit width 1.2-1.3 in longest dorsal fin ray; spines absent on posterior edge of opercle. Color dark red; vague dusky bars on back in smaller specimens; terminal margin of branchiostegal membrane edged with black.

(24″) *MELANOSTOMUS* * (page 84)

46b—Head length 2.5-2.7 in standard length; orbit width 1.5-1.8 in longest dorsal fin ray; spines present on posterior edge of opercle. Color orange-red; smaller specimens often with vague bars and spots.

(30″) *ALEUTIANUS* * (page 82)

45b—Rakers on first gill arch 24-28; anal fin rays 6, occasionally 5; orbit width 1.4-1.8 in length of second anal fin spine. Color uniformly pink. (13″) *AURORA* * (page 88)

44b—Pores in lateral line 40-58.

47a—Pores in lateral line 53-58; length of second anal fin spine 4.8-5.6 in head; ventral fin spine 3.9-4.4 in head. Color blackish-red above and red below; lateral line in a clear red zone. (24″) *MACDONALDI* * (page 90)

47b—Pores in lateral line 40-50; length of second anal fin spine 2.1-3.8 in head; ventral fin spine 1.9-3.3 in head.

48a—Rakers on first gill arch 29-33; several black blotches on back; peritoneum brown or black. Color (41b).

CRAMERI * (page 66)

48b—Rakers on first gill arch 35-42; no black blotches on back; peritoneum silvery-white. Color (39a).

MINIATUS * (page 62)

34b—Coronal spines present. Nuchal spines usually present.

49a—Rakers on first gill arch 24-28; orbit width 1.4-1.8 in length of second anal fin spine; inside of mouth without black blotches. Color (45b). *AURORA* * (page 88)

49b—Rakers on first gill arch 30-34; orbit width 0.8-1.3 in length of second anal fin spine; inside of mouth usually with black blotches in large specimens. Color (46b).

ALEUTIANUS * (page 82)

1b—Interorbital space at mid-orbits concave (depressed) below tops of ocular ridges.

50a—Supraocular spines absent.

51a—Coronal spines absent. Spines on top of head single.

52a—Nuchal spines absent.

53a—Anterior ends of premaxillaries project forward of snout as dentigerous knobs (the tip of the lower jaw fits into the concavity between the knobs). Color (19a). *DIPLOPROA* * (page 86)

53b—Anterior ends of premaxillaries do not project forward as dentigerous knobs.

54a—Underside of mandible covered with scales.

55a—Anal rays 7, rarely 5, 6 or 8; symphyseal knob strong; two triangular spines on lower edge of suborbital bone (occasionally one of these bifid).

56a—Pectoral fin rays 16, rarely 15 or 17; unbranched pectoral rays 6 or 7, not thickened; spines present on posterior margin of gill cover opposite preopercular spines. Color (27b). *SAXICOLA* * (page 80)

56b—Pectoral fin rays 17, occasionally 18; unbranched pectoral rays 8 or 9, thickened; spines absent on posterior margin of gill cover. Color (27a).
ZACENTRUS * (page 102)

55b—Anal rays 6; symphyseal knob slight or absent; triangular spines absent on lower edge of suborbital bone.

57a—Interorbital space 7.0-8.1 in head; length of anal fin base 3.0-3.1 in head. Color pink with four distinct irregular green stripes on each side of body.
(13") *ELONGATUS* (page 108)

57b—Interorbital space 4.7-5.8 in head; length of anal fin base 2.3-2.5 in head. Color (28a). *WILSONI* * (page 100)

54b—Underside of mandible naked, or only with patches of scales.

58a—Two triangular spines on lower edge of suborbital bone (the rearmost spine sometimes multifid); several bright-red bars (faded in largest specimens) across body. Color (30a).
RUBRIVINCTUS * (page 92)

58b—Rounded projections, or at most only one triangular spine, on lower edge of suborbital bone; no bright-red bars across body.

59a—Rakers on first gill arch 31-34; terminal profile of anal fin (from first to last ray) nearly vertical or truncate. Color light yellow-green with irregular brown bars, blotches and spots; brown streaks and spots on caudal fin.
(8") *DALLI* * (page 110)

59b—Rakers on first gill arch 27-33; terminal profile of anal fin (from first to last ray) rounded, or with anterior slant.

60a—Orange-brown spotting on lower anterior of body. Color (29a). *MALIGER* * (page 94)

60b—No orange-brown spotting on lower anterior of body.

61a—Spines on top of head low, rather prostrate; interorbital space slightly concave below tops of ocular ridges.

62a—Orbit width 1.6-1.8 in length of ventral fin spine. Color (31a). (See Fig. 4) *CAURINUS* * (page 96)

62b—Orbit width 1.3-1.5 in length of ventral fin spine. Color (31b). (See Fig. 4)
VEXILLARIS * (page 98)

61b—Spines on top of head high, rather upright; interorbital space greatly concave below tops of ocular ridges.

63a—Unbranched pectoral fin rays 10, occasionally 9 or 11; whitish spotting on fins. Color blue-black mottled with yellow; a continuous irregular yellow stripe starts on membrane between 3rd and 4th dorsal fin spines, down to lateral line, thence along lateral line to tail (16") *NEBULOSUS* (page 126)

63b—Unbranched pectoral fin rays 8 or 9, occasionally 7 or 10; no whitish spotting on fins; no continuous yellow stripe. Color olive-brown to black mottled with lighter blotches.

64a—Color dark olive or olive-brown mottled with blotches of light gray or pink.
(15″) *CARNATUS* (page 128)

64b—Color black mottled with blotches of yellow.
(15″) *CHRYSOMELAS* (page 130)

52b—Nuchal spines present.

65a—Mandible covered with scales. Color (27a).
ZACENTRUS * (page 102)

65b—Mandible naked, or with patches of scales.

66a—Rakers on first gill arch 31-34; brown streaks and spots on caudal fin. Color (59a). *DALLI* * (page 110)

66b—Rakers on first gill arch 26-32; no brown streaks and spots on caudal fin.

67a—Sides of body with several distinct red or black bars; spines absent on posterior margin of gill cover (rarely, one spine present).

68a—Red bars on sides of body; two triangular spines on lower edge of suborbital bone (rearmost spine often multifid). Color (30a). *RUBRIVINCTUS* * (page 92)

68b—Black bars on sides of body; triangular spines absent on lower edge of suborbital bone (rounded projections often present). Color light olive with black bars on sides of body; lips usually tinged with pink.
(16″) *SERRICEPS* (page 132)

67b—Sides of body without bars; mottled; spines present on posterior margin of gill cover. Color (31b).
VEXILLARIS * (page 98)

51b—Coronal spines present. Nuchal spines present or absent. Most spines on top of head much divided. Color orange with several distinct black-red bars on sides of body. (24″) *NIGROCINCTUS* * (page 134)

50b—Supraocular spines present.

69a—Coronal spines absent.

70a—Nuchal spines absent.

71a—Mandible covered with scales.

72a—Tip of second anal fin spine reaches to tips of anal fin rays or slightly less (0.1 orbit width) or slightly more (0.1 orbit width), when fin is depressed; orbit width 0.1 in least width of suborbital bone. Color pink with some light green above lateral line and some light yellow below.
(12″) *RHODOCHLORIS* (page 114)

72b—Tip of second anal fin spine fails to reach tips of anal fin rays by 0.2 to 0.6 orbit width (fin depressed); orbit width 0.2-0.4 in least width of suborbital bone.

73a—Interorbital space 5.1-6.8 in head; body without whitish dots.

74a—Rakers on first gill arch 34-36. Color light-orange, overlaid everywhere with fine blackish dots around margins of scales (honeycomb appearance).
(18″) *UMBROSUS* (page 112)

74b—Rakers on first gill arch 28-33; body without blackish dots. Color faded pink with faded irregular streaks and small blotches of green on back. (22″) *EOS* * (page 122)

73b—Interorbital space 7.5-9.0 in head. Color orange-red shading to yellowish on sides; sides profusely covered with white or pink-white dots. (15″) *CONSTELLATUS* * (page 124)

71b—Mandible naked, or with patches of fine scales.

75a—Tip of second anal fin spine fails to reach tips of anal fin rays by 0.8-1.4 orbit width (fin depressed); top of head shallowly and flatly concave; ocular and parietal ridges increasingly rugose in specimens over about 12 inches length. Color dark-red dorsally becoming yellow-orange on sides. (Specimens under about 12 inches length have a whitish stripe along lateral line and another shorter stripe about midway between lateral line and the ventral surface; fins with blackened tips.)

(36″) *RUBERRIMUS* * (page 104)

75b—Tip of second anal fin spine fails to reach tips of anal fin rays by 0.2-0.6 orbit width (fin depressed); top of head sharply and deeply concave; top of head spines always single.

76a—Body color orange-red profusely covered with whitish dots; longest dorsal fin ray 7.0-7.8 in standard length. Color (73b).

CONSTELLATUS * (page 124)

76b—Body not covered with whitish dots; longest dorsal fin ray 5.8-7.3 in standard length.

77a—Two sharply triangular spines present on lower margin of suborbital bone; back with numerous greenish spots and streaks.

78a—Orbit width 1.4 in length of ventral fin spine; branchiostegals without scales. Color pink with irregular green streaks and spots on back.

(15″) *CHLOROSTICTUS* * (page 120)

78b—Orbit width 1.1-1.3 in length of ventral fin spine; branchiostegals usually with scales. Color (74b).

EOS * (page 122)

77b—Two projections on lower margin of suborbital bone but these usually not sharply triangular; back without a number of greenish streaks and spots.

79a—Orbit width 1.3-1.4 in length of ventral fin spine; least depth of caudal peduncle 4.0-4.5 in head. Color red with some yellow; the four or five whitish blotches bordered with purple-red. (Fig. 5) (12″) *ROSACEUS* * (page 116)

79b—Orbit width 1.0-1.2 in length of ventral fin spine; least depth of caudal peduncle 4.6-5.0 in head. Color orange-yellow with some light olive on back; the four or five whitish blotches bordered with pink or orange. (Fig. 5)

(13″) *HELVOMACULATUS* * (page 118)

70b—Nuchal spines present.

80a—Underside of mandible covered with scales.

81a—Pores in lateral line 53-58; rakers on first gill arch 37-38; lower jaw projects beyond snout by 0.3-0.6 orbit width. Color (47a).

MACDONALDI * (page 90)

81b—Pores in lateral line 27-40; rakers on first gill arch 24-33; lower jaw not projecting beyond snout, or projecting by not more than 0.2 orbit width.

82a—Pores in lateral line 34-40; spines present on posterior margin of gill cover opposite preopercular spines. Color (74b).

EOS * (page 122)

82b—Pores in lateral line 27-31; spines absent on posterior margin of gill cover (occasionally a spine may be present on one side).

83a—Rakers on first gill arch 29-35; orbit width 0.9-1.1 in length of second anal fin spine; mouth and gill cavities blotched with black. Color (46a).
MELANOSTOMUS * (page 84)

83b—Rakers on first gill arch 24-28; orbit width 1.4-1.8 in length of second anal fin spine; mouth and gill cavities not blotched with black, except for a small dusky blotch on underside of opercle. Color (45b). *AURORA* * (page 88)

80b—Underside of mandible naked, or with patches of scales.

84a—Dorsal fin rays 15, occasionally 13 or 14; preopercular spines blunt and usually bifid or multifid; top of head spines become rugose in specimens over about 12 inches length. Color (75a).
RUBERRIMUS * (page 104)

84b—Dorsal fin rays 13, occasionally 12 or 14; preopercular spines sharp, single; top of head spines not rugose.

85a—Pectoral fin rays 18 or 19, occasionally 20; orbit width 4.7-4.8 in head, 4.0-4.6 in greatest body depth. Color orange-red with bronze-colored spots and small blotches on upper body. (24") *GILLI* (page 106)

85b—Pectoral fin rays 16 or 17, occasionally 15 or 18; orbit width 3.0-4.0 in head, 2.6-3.5 in greatest body depth.

86a—Orbit width 1.3-1.6 in longest dorsal fin spine, 1.7-2.1 in length of upper jaw, 3.0-3.5 in greatest body depth. Color (79a). (See Fig. 5) *ROSACEUS* * (page 116)

86b—Orbit width 1.1-1.3 in longest dorsal fin spine, 1.5-1.7 in length of upper jaw; 2.6-2.9 in greatest body depth. Color (79b). (See Fig. 5) *HELVOMACULATUS* * (page 118)

69b—Coronal spines present.

87a—Nuchal spines absent.

88a—Interorbital space sharply and deeply concave, 7.5-9.0 in head; pectoral fin rays 17. Color (73b). *CONSTELLATUS* * (page 124)

88b—Interorbital space shallowly and flatly concave, 5.7-7.0 in head; pectoral fin rays 18-20. Color (75a). *RUBERRIMUS* * (page 104)

87b—Nuchal spines present.

89a—Underside of mandible covered with scales; pores in lateral line 27-30; lower pectoral fin rays not thickened. Color (45b).
AURORA *. (page 88)

89b—Underside of mandible naked, or with patches of scales; pores in lateral line 40-50; lower pectoral fin rays thickened.

90a—Symphyseal knob strong; low frontal ridges between ocular ridges; spines present on posterior margin of gill cover opposite preopercular spines; no black-red bars on sides of body. Color (75a). *RUBERRIMUS* * (page 104)

90b—Symphyseal knob slight or absent; high frontal ridges between ocular ridges; no spines on posterior margin of gill cover; black-red bars present on sides of body. Color (51b).
NIGROCINCTUS * (page 134)

GENUS *SCORPAENA* (SCULPIN OR SCORPIONFISH)

Although there are a number of species included in the genus *Scorpaena* these are primarily associated with warm waters and only one, *Scorpaena guttata,* has been reported as far north as Point Conception during the past 50 years. This species was taken as far north as Monterey Bay in the 1850's during a period when the ocean waters apparently were warmer in that region (Hubbs 1948). Sculpins are caught in relatively shallow water, usually not deeper than 150 feet, in bays, and along shore.

General Description

The interorbital space on top of the head is narrow and concave, with a curved, transverse groove between the typanic spines and the anterior bases of the parietal ridges. A series of wide, strong, spiny ridges which are covered with thick skin is found on the head. A paired series of spines on top of the head commences with the nasal and is followed by the preocular, supraocular, postocular, tympanic, parietal and nuchal spines. The parietal and nuchal spines forming the parietal ridge, are of nearly equal length. A short ridge composed of about three spines is present on each upper side of the head. This ridge commences at the posterior rim of the orbit and extends backward about on a level with the upper margin of pupil. At the anterior end of the lateral line there is a triangular cleithral spine, with the similar supracleithral spine, slightly anterior to and above this. A suborbital ridge composed of two or three spines is present just below the lower rim of each orbit. This ridge commences anterior to each orbit and extends backward so that the last spine is superimposed on the base of the uppermost preopercular spine. Occasionally a small, blunt, bifid spine is present behind the lower margin of each orbit. On the lower margin of each suborbital bone, there are usually three spines; the rearmost is the longest and on occasion, double.

Numerous dermal flaps are present on the body and head. On the upper part of the body, practically every scale has a small, thin flap. On the head, a broad, fringed flap is present at the posterior rim of the larger, anterior nostril opening; a long flap occurs between the supraocular and postocular spines and at the base of the rearmost suborbital spine. Small dermal flaps are found part way around the margin of the membrane covering each eye and may be present elsewhere on the head.

Head length is contained 2.3-2.5 times in standard length; greatest body depth 3.0-3.3 in standard length; orbit width 3.9-4.6 in head length, 1.0-1.3 in snout length, or 0.6 in interorbital space. The tip of the lower jaw, which lies about even with the tip of the upper jaw, bears a low downward-projecting symphyseal knob. Dorsal fin with 8-10 rays; anal fin with 5-6 rays; pectoral fin with 17-19 rays, with the longest rays in the upper half of fin.

Key to Species of Scorpaena

(Since just the one species, *Scorpaena guttata,* occurs in California, the "Key to the genera of Scorpaenidae" will serve as a key to the species.)

FOREWORD TO DESCRIPTIONS OF SPECIES

In the following section the information for each species occupies two facing pages. On one page appears a photograph and a classified summary of certain characters that are not readily subjected to measurement. On the facing page appears a table of proportional measurements and meristic counts. The proportions given in the table were calculated. They were not obtained by "stepping off" with calipers or

dividers. Spine counts for the dorsal and anal fins are omitted because, typically, these numbers are constant, namely 13 preceding the rays in the dorsal fin and three preceding the rays in the anal fin (see "Meristic Abnormalities" for exceptions). At the foot of the table is listed the number of specimens upon which proportional measurements and meristic counts were made. In some cases, an additional number is listed, such a "plus 6." This indicates that additional specimens (6) were observed only for the purpose of obtaining meristic counts. Also listed is the over-all length range of the series that was subjected to both measurements and counts. Since certain proportions will vary with the length of the fish, the proportions given may not be representative of fishes whose sizes are smaller or larger than those examined in the present study.

Under "Range" the known geographical range for a species during the past 20 years is indicated. The greatest depth at which it is known to have been caught is shown in fathoms and the size listed is the known, maximum total length in inches.

In the "Addenda" are presented four charts (Figures 63-66) in which certain meristic counts and proportional measurements are depicted as bar-diagrams. The species of *Sebastodes* characterized by a convex interorbital space are placed at the top of the list, while those with a deeply concave interorbital space appear at the bottom.

Other measurements were made but the results warrant only a general summary. The variation of the range of various measurements expressed in terms of standard length: tip of snout to origin of dorsal fin (2.5-3.3); tip of snout to origin of ventral fins (2.0-2.8); tip of snout to origin of anal fin (1.3-1.5); distance between origins of ventral fins and anal fin (2.3-3.8); length of base of spinous portion of dorsal fin (2.2-3.2); length of base of soft portion of dorsal fin (3.9-5.9). Of these, the length of the base of the soft dorsal fin offered the most promise as a possible secondary character for certain species. One problem encountered in making measurements from the snout to the fins on the dorsal and ventral surfaces of the body is in ascertaining that the head is not bent abnormally upward or downward.

In addition, the origins of the pectoral, ventral and anal fins, and the position of the anus were noted in relation to the spines and rays of the dorsal fin vertically above these points. The variation for all specimens of all species combined were found to be as follows: the origin of the pectoral fins varied from slightly in advance of the first dorsal fin spine to under the fourth spine; the origin of the ventral fins varied from under the first to under the sixth dorsal fin spine; the origin of the anal fin varied from under the thirteenth dorsal fin spine to under the fifth dorsal fin ray. In *jordani* the posterior margin of the anus occurred under the ninth to eleventh dorsal fin spines, while in the remaining species of *Sebastodes* it occurred under the twelfth spine to under the third ray. The position of the anus was useful in separating the one species noted above.

FIGURE 6

LONGSPINE CHANNEL ROCKFISH
Sebastolobus altivelis Gilbert 1893

Range—Cape San Lucas, Baja California to Aleutian Islands, Alaska.
Greatest depth taken and maximum size—430 fathoms; 15 inches.
Body color—Red with some black on fins; usually one or two black blotches on membrane of spinous dorsal fin.
Mouth and gill cavities—Considerable black or dark gray in gill cavity, a black blotch on underside of gill cover; mouth lighter.
Peritoneum—White with black dots; uniformly blackish in small specimens.
Top of head at mid-orbits—Narrow and strongly concave; a vague frontal ridge on either side of the median groove.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, strong and sharp. *Coronal spines absent.* (See generic description for other ridges and spines on sides of head.)
Parietal ridges—High and thin.
The five preopercular spines—Strong and sharp, with uppermost spine longest (the spiny, suborbital ridge terminates at its base); spines somewhat radially-directed.
The two opercular spines—Strong, long and sharp.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Two sharply triangular spines present, the anterior one directed outward, the posterior one somewhat rearward.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A small, sharp, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent.
End of Maxillary—Under rear of pupil to rear of orbit.
Maxillaries—With scales, sometimes in patches.
Mandibles—Usually without scales, but occasionally with a patch of scales.
Branchiostegals—Usually with scales, but occasionally naked.
End of pectoral and ventral fins—Ends of ventrals reach anus and ends of pectorals reach beyond, sometimes to origin of anal fin.
Second anal fin spine—About twice as thick as third. Tip of second extends beyond tip of third by one-sixth to one-third orbit width, usually reaching to ends of anal fin rays, or slightly beyond. (Spines depressed.)
Spinous dorsal fin membrane—Rather deeply incised.
Posterior profile of caudal fin—Slightly convex (rounded).
Terminal profile of anal fin—Truncate, or with a slight anterior slant.

Sebastolobus altivelis Gilbert 1893

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.3 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	3.4 – 4.1	1.4 – 1.7	1.6 – 2.2
Depth of body at origin of anal fin	4.6 – 5.6	1.9 – 2.4	1.2 – 1.6
Length of base of anal fin	7.9 – 9.2	3.3 – 4.0	0.7 – 1.0
Length of snout	9.7 –11.6	3.9 – 4.6	0.6 – 0.8
Width of orbit	6.5 – 8.0	2.8 – 3.2	--- ---
Width of interorbital space	--- ---	8.5 –11.1	0.2 – 0.3
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	4.9 – 5.5	2.1 – 2.2	1.3 – 1.4
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- ---	--- ---	1.0 – 1.4
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.0
Longest pectoral fin ray	3.0 – 3.6	1.3 – 1.5	1.8 – 2.5
Longest ventral fin ray	--- ---	1.6 – 1.9	1.5 – 2.0
Length of ventral fin spine	--- ---	2.4 – 2.9	1.0 – 1.2
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.7
Length of second anal fin spine	4.2 – 5.2	1.7 – 2.1	1.4 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.0 – 1.3
Longest anal fin ray	5.4 – 6.9	2.3 – 3.8	1.0 – 1.4
Longest dorsal fin spine	5.1 – 7.0	2.0 – 3.1	1.0 – 1.6
Longest dorsal fin ray	5.1 – 6.3	2.0 – 2.6	1.1 – 1.4
Least depth of caudal peduncle	8.7 –11.3	3.8 – 4.8	0.6 – 0.8
Ventral length of caudal peduncle	--- ---	1.9 – 2.4	1.2 – 1.6
Dorsal length of caudal peduncle	--- ---	2.5 – 3.0	1.0 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.1 – 0.2

Number of rays in dorsal fin	8 or 9 (occas. 10)
Number of rays in anal fin	5 (occas. 4 or 6)
Number of rays in each pectoral fin	22–24
Unbranched rays in each pectoral fin	None
Number of rakers on first gill arch	21–26
Number of pores in lateral line	28–32
Diagonal rows of scales below lateral line	32–38

Number of specimens examined	20
Size of specimens examined	5.5 – 12.7 inches

OTHER COMMON NAMES

Idiot, hooligan, thornhead, lobe-finned rockfish, spiny-cheeked rockfish, bonehead, scorpion, anglefin rockfish, deep-water rockfish

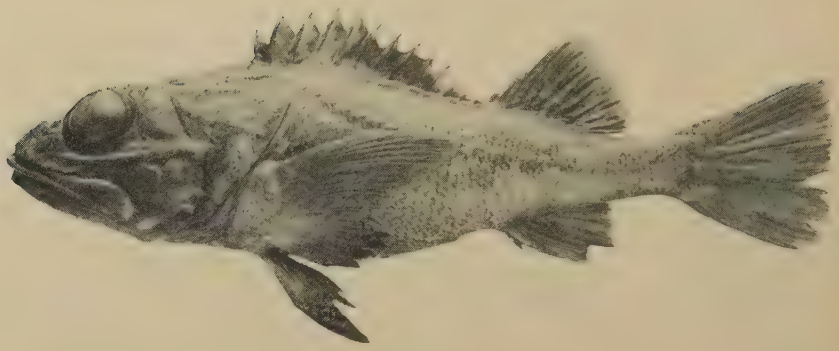

FIGURE 7

SHORTSPINE CHANNEL ROCKFISH
Sebastolobus alascanus Bean 1890

Range—San Diego, California to Bering Sea.
Greatest depth taken and maximum size—300 fathoms; 24 inches.
Body color—Red with some black on fins; usually one or two black blotches on membrane of spinous dorsal fin.
Mouth and gill cavities—Usually pink but occasionally with a darkened patch on underside of gill cover.
Peritoneum—White, or white with black dots; darker in smaller specimens.
Top of head at mid-orbits—Narrow and strongly concave; a vague frontal ridge on either side of the median groove.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchal spines present, strong and sharp. *Coronal spines absent.* (See generic description for other ridges and spines on sides of head.)
Parietal ridges—High and thin.
The five preopercular spines—Strong and sharp, with uppermost spine longest (the spiny, suborbital ridge terminates at its base); spines somewhat radially-directed.
The two opercular spines—Strong, long and sharp.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Two triangular spines present (blunt in large specimens), the anterior one directed outward, the posterior one somewhat rearward.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A small, sharp, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil to rear of orbit.
Maxillaries—Without scales, or with a patch or two of fine scales.
Mandibles—Without scales.
Branchiostegals—Without scales.
End of pectoral and ventral fins—Ends of ventrals usually not reaching anus, but occasionally so; ends of pectorals reach anus or slightly beyond.
Second anal fin spine—About twice as thick as third. Tip of second barely reaches tip of third, or extends beyond by one-quarter orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly convex (rounded).
Terminal profile of anal fin—Truncate, or nearly so.

Sebastolobus alascanus Bean 1890

Measurement	Frequency of measurement into: Standard length	Frequency of measurement into: Head length	Frequency of orbit width into measurement
Length of head	2.2 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	3.6 – 4.3	1.5 – 1.8	1.7 – 2.4
Depth of body at origin of anal fin	5.2 – 6.4	2.2 – 2.8	1.2 – 1.6
Length of base of anal fin	8.4 –10.8	3.4 – 4.6	0.7 – 0.9
Length of snout	9.1 –10.7	4.1 – 4.6	0.7 – 0.9
Width of orbit	6.5 – 8.6	2.9 – 3.7	--- ---
Width of interorbital space	--- ---	9.1 –10.8	0.3 – 0.4
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	4.4 – 5.3	2.0 – 2.1	1.4 – 1.8
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- --	--- ---	1.1 – 1.7
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.0
Longest pectoral fin ray	3.4 – 4.1	1.5 – 1.8	1.7 – 2.4
Longest ventral fin ray	--- ---	1.7 – 2.2	1.5 – 1.7
Length of ventral fin spine	--- ---	2.6 – 3.5	1.0 – 1.1
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.7
Length of second anal fin spine	4.9 – 8.6	2.0 – 3.9	1.0 – 1.6
Length of third anal fin spine	--- ---	--- ---	0.8 – 1.3
Longest anal fin ray	6.2 – 7.6	2.5 – 3.2	1.0 – 1.3
Longest dorsal fin spine	6.4 – 9.2	2.4 – 4.1	0.8 – 1.2
Longest dorsal fin ray	5.6 – 6.7	2.4 – 2.8	1.1 – 1.4
Least depth of caudal peduncle	10.2 –12.5	4.3 – 5.4	0.6 – 0.8
Ventral length of caudal peduncle	--- ---	1.8 – 2.6	1.4 – 1.7
Dorsal length of caudal peduncle	--- ---	2.2 – 2.8	1.0 – 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.1 – 0.2

Number of rays in dorsal fin	9 or 10 (occas. 8)
Number of rays in anal fin	5 (occas. 4)
Number of rays in each pectoral fin	20–23
Unbranched rays in each pectoral fin	None
Number of rakers on first gill arch	18–23
Number of pores in lateral line	29–33
Diagonal rows of scales below lateral line	35–46

Number of specimens examined	18
Size of specimens examined	6.7 – 24.0 inches

OTHER COMMON NAMES

Idiot, hooligan, thornhead, lobe-finned rockfish, spiny-cheeked rockfish, bonehead, scorpion, fagiano

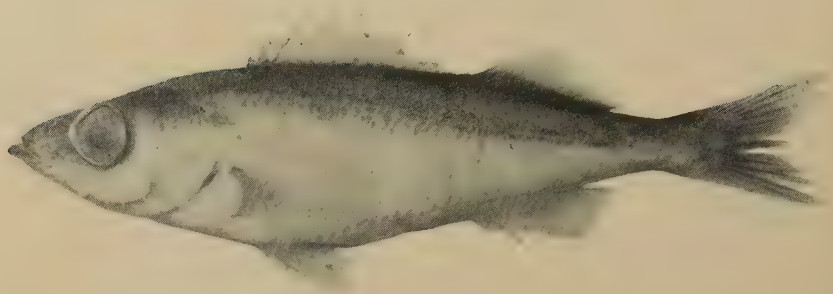

FIGURE 8

SHORTBELLY ROCKFISH
Sebastodes jordani Gilbert 1893

Range—Ensenada, Baja California to Coast of Washington.
Greatest depth taken and maximum size—120 fathoms; 12 inches.
Body color—Olive-pink dorsally becoming light pink on sides; fins same color as adjacent body parts.
Mouth and gill cavities—White and pink; a small dark patch on undersides of gill cover.
Peritoneum—Gray with black dots or black.
Top of head at mid-orbits—Moderately convex.
Spines on top of head—Weak, and in some cases obsolete. (It is difficult to determine the presence of the various spines in adults, although they are identifiable in young.) All, or some of the following may be weakly present: nasal, preocular, postocular, tympanic and parietal. *The supraocular, coronal and nuchal spines are always absent.*
Parietal ridges—Weakly present.
The five preopercular spines—Small and sharp, tending to be directed backward; usually the second and third from the top are stronger than the others.
The two opercular spines—Short, thin and sharp.
Supracleithral and cleithral spines—Absent, or only weakly present.
Lower margin of suborbital bone—Two small spines usually present, the rear-most directed backward.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A small, sharp, rather forward-projecting knob present.
Raised patch of teeth on tip of lower jaw—Absent, although a slight elevation may be present.
End of maxillary—Under mid-orbit, or barely so.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend slightly beyond tips of ventrals, reaching to anus.
Second anal fin spine—Hardly thicker than the third. Tip of the second fails to reach tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Slanted posteriorly.

Sebastodes jordani Gilbert 1893

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.9	--- ---	--- ---
Depth of body at origin of ventral fins	3.8 – 4.1	1.3 – 1.4	2.7 – 3.0
Depth of body at origin of anal fin	4.8 – 5.1	1.7	2.2 – 2.4
Length of base of anal fin	5.7 – 6.7	1.9 – 2.3	1.6 – 2.0
Length of snout	10.7 –11.9	3.7 – 4.0	0.9 – 1.0
Width of orbit	10.7 –11.9	3.8 – 4.0	--- ---
Width of interorbital space	--- ---	4.4 – 4.7	0.8 – 0.9
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	7.1 – 7.3	2.5 – 2.7	1.5 – 1.7
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.3 – 1.7
Width of base of pectoral fin	--- ---	--- ---	0.8
Longest pectoral fin ray	4.4 – 4.6	1.5 – 1.6	2.3 – 2.7
Longest ventral fin ray	--- ---	2.0 – 2.2	1.8 – 2.1
Length of ventral fin spine	--- ---	2.8 – 3.1	1.2 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	9.0 –10.1	3.1 – 3.4	1.2
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.3
Longest anal fin ray	6.8 – 7.5	2.4 – 2.6	1.5 – 1.6
Longest dorsal fin spine	6.9 – 7.8	2.4 – 2.7	1.4 – 1.6
Longest dorsal fin ray	7.1 – 8.6	2.5 – 2.9	1.3 – 1.5
Least depth of caudal peduncle	11.4 –14.1	4.0 – 4.8	0.8 – 1.0
Ventral length of caudal peduncle	--- ---	1.7 – 2.0	1.9 – 2.3
Dorsal length of caudal peduncle	--- ---	2.1 – 2.4	1.6 – 2.0
Posterior of anus to origin of anal fin	--- ---	--- ---	1.1 – 1.5
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	14 or 15 (occas. 13 or 16)
Number of rays in anal fin	9 or 10 (occas. 8 or 11)
Number of rays in each pectoral fin	20 or 21 (occas. 19)
Unbranched rays in each pectoral fin	10–13
Number of rakers on first gill arch	42–47
Number of pores in lateral line	52–59
Diagonal rows of scales below lateral line	65–70

Number of specimens examined	9, plus 10
Size of specimens examined	6.5 – 11.2 inches

OTHER COMMON NAMES

Slim rockfish, slender rockfish, steamer rockfish

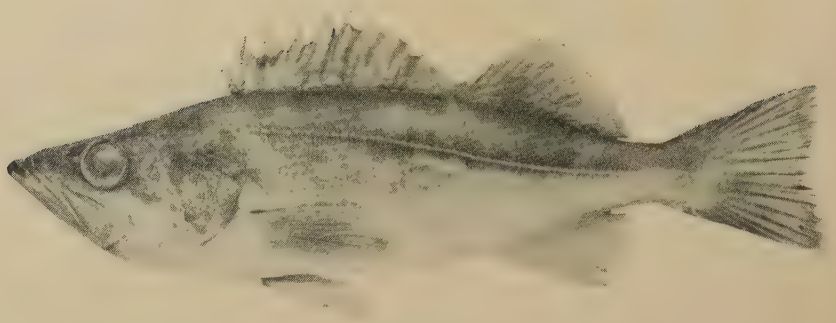

FIGURE 9

BOCACCIO

Sebastodes paucispinis (Ayres 1854)

Range— Ensenada, Baja California to Queen Charlotte Sound, B. C.
Greatest depth taken and maximum size—175 fathoms; 36 inches.
Body color—Light, olive-brown dorsally becoming pink on sides. Specimens less than about 10 inches with small brown spots on sides.
Mouth and gill cavities—White, with some pink and dusky.
Peritoneum—Silvery white, sometimes with a few black dots; black dots numerous in specimens less than about 10 inches length.
Top of head, at mid-orbits—Strongly and rather evenly convex.
Spines on top of head—Obsolete, except that sometimes nasal and parietal spines are weakly present.
Parietal ridges—Weakly present.
The five preopercular spines—Moderately strong, sharp, radially directed.
The two opercular spines—Moderately strong, thin and sharp, the uppermost usually longest.
Supracleithral and cleithral spines—Present, but supracleithral rather weak.
Lower margin of suborbital bone—Two small spines, present in specimens less than about 10 inches, become obsolete in larger specimens.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A knob is absent, but tip of lower jaw is noticeably thickened
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of orbit, or slightly beyond.
Maxillaries—Covered with Scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
End of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, but fail to reach anus by about an orbit width.
Second anal fin spine—Hardly thicker than the third. Tip of second does not reach tip of third by about one-quarter of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, slightly rounded, or with a slight posterior slant.

Sebastodes paucispinis (Ayres 1854)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	3.4 – 4.1	1.2 – 1.5	3.2 – 4.1
Depth of body at origin of anal fin	4.4 – 5.2	1.6 – 1.9	2.5 – 3.1
Length of base of anal fin	6.4 – 7.6	2.3 – 2.9	1.7 – 2.2
Length of snout	8.3 – 9.3	3.1 – 3.4	1.4 – 1.6
Width of orbit	12.9 –14.2	4.6 – 5.1	--- ---
Width of interorbital space	--- ---	4.2 – 4.8	1.0 – 1.2
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	4.7 – 5.2	1.7 – 1.9	2.5 – 2.9
Amount that lower jaw projects	--- ---	--- ---	0.3 – 0.4
Thickness of body	--- ---	--- ---	1.4 – 2.2
Width of base of pectoral fin	--- ---	--- ---	0.7 – 0.8
Longest pectoral fin ray	4.3 – 4.9	1.6 – 1.8	2.6 – 3.1
Longest ventral fin ray	--- ---	1.9 – 2.2	2.2 – 2.4
Length of ventral fin spine	--- ---	3.0 – 3.7	1.4 – 1.8
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.5
Length of second anal fin spine	13.5 –16.1	4.7 – 6.0	0.8 – 1.1
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.3
Longest anal fin ray	6.2 – 7.1	2.3 – 2.9	1.8 – 2.1
Longest dorsal fin spine	6.5 – 7.8	2.4 – 3.0	1.7 – 2.1
Longest dorsal fin ray	6.6 – 7.8	2.5 – 2.8	1.7 – 2.0
Least depth of caudal peduncle	10.9 –12.2	4.1 – 4.7	1.0 – 1.2
Ventral length of caudal peduncle	--- ---	2.0 – 3.0	2.1 – 2.4
Dorsal length of caudal peduncle	--- ---	2.2 – 2.7	1.8 – 2.1
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.3

Number of rays in dorsal fin	14 (occas. 13 or 15)
Number of rays in anal fin	9 (occas. 10)
Number of rays in each pectoral fin	15 (occas. 16)
Unbranched rays in each pectoral fin	5 or 6 (occas. 7)
Number of rakers on first gill arch	28–31
Number of pores in lateral line	54–58
Diagonal rows of scales below lateral line	72–90

Number of specimens examined	10, plus 30
Size of specimens examined	6.2 – 25.0 inches

OTHER COMMON NAMES

Salmon grouper, grouper, tomcod (for young)

FIGURE 10

SILVERGRAY ROCKFISH
Sebastodes brevispinis (Bean 1883)

Range—Point Sur, California to Bering Sea.
Greatest depth taken and maximum size—130 fathoms; 28 inches.
Body color—Dark gray on back becoming silver gray on sides and abruptly white, ventrally; lips blackened; lower portions of pectoral, anal and ventral fins tinged with pink.
Mouth and gill cavities—Whitish-pink with dusky areas; a dark splotch on underside of opercle.
Peritoneum—White with numerous black dots, resulting in a light-gray appearance.
Top of head at mid-orbits—Strongly convex, with a flattening near orbits.
Spines on top of head—Mostly obsolete. Nasal, preocular and parietal usually present. Supraocular, postocular, tympanic, coronal and nuchal spines usually absent.
Parietal ridges—Moderately strong.
The five preopercular spines—Strong, sharp, except that lowermost one or two often reduced in size; the upper two or three sometimes directed backward.
The two opercular spines—Long and sharp.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Usually with a small lobe, followed by a single or multifid spine.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A strong, forward and downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A strongly raised patch is present, not completely included by snout when jaws are closed.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—Scales present.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals but do not reach anus by about orbit width.
Second anal fin spine—Usually only slightly thicker than third, but occasionally twice as thick. Tip of second spine usually fails to reach tip of third, but occasionally does (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or slightly convex (rounded).

Sebastodes brevispinis (Bean 1883)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	3.1 – 3.4	1.1 – 1.3	3.8 – 4.1
Depth of body at origin of anal fin	4.0 – 4.4	1.5 – 1.6	3.0 – 3.3
Length of base of anal fin	7.2 – 8.6	2.6 – 3.2	1.4 – 1.8
Length of snout	8.7 – 9.6	3.2 – 3.5	1.3 – 1.5
Width of orbit	11.9 –13.1	4.4 – 4.9	--- ---
Width of interorbital space	--- ---	4.5 – 4.8	1.0 – 1.1
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	5.0 – 5.5	1.9 – 2.0	2.3 – 2.6
Amount that lower jaw projects	--- ---	--- ---	0.3 – 0.6
Thickness of body	--- ---	--- ---	1.7 – 1.9
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.2
Longest pectoral fin ray	3.8 – 4.4	1.4 – 1.6	3.0 – 3.3
Longest ventral fin ray	--- ---	2.1 – 2.3	2.0 – 2.3
Length of ventral fin spine	--- ---	3.2 – 3.6	1.3 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.8
Length of second anal fin spine	8.4 –10.3	3.0 – 3.7	1.2 – 1.5
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.4
Longest anal fin ray	6.2 – 7.1	2.4 – 2.6	1.8 – 2.1
Longest dorsal fin spine	7.0 – 8.5	2.6 – 3.1	1.5 – 1.9
Longest dorsal fin ray	7.2 – 8.4	2.6 – 3.0	1.5 – 1.7
Least depth of caudal peduncle	10.6 –11.5	3.9 – 4.2	1.1 – 1.2
Ventral length of caudal peduncle	--- ---	1.8 – 2.0	2.3 – 2.7
Dorsal length of caudal peduncle	--- ---	2.5 – 2.9	1.6 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	14 or 15
Number of rays in anal fin	7
Number of rays in each pectoral fin	17 or 18
Unbranched rays in each pectoral fin	8 or 9
Number of rakers on first gill arch	33–36
Number of pores in lateral line	44–49
Diagonal rows of scales below lateral line	58–70

Number of specimens examined	10, plus 2
Size of specimens examined	17.5 – 24.0 inches

OTHER COMMON NAMES

Shortspine rockfish

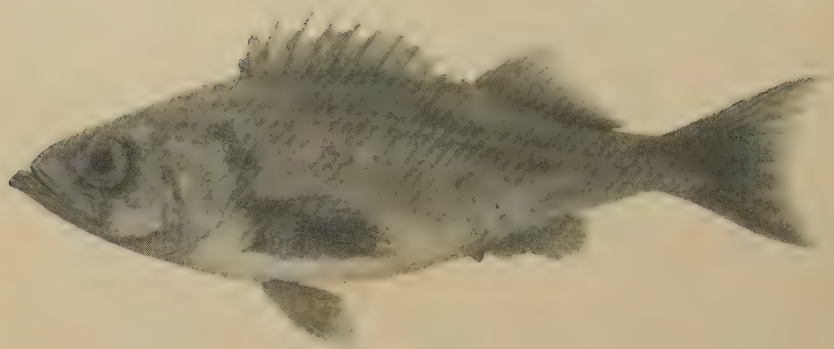

FIGURE 11

CHILIPEPPER
Sebastodes goodei Eigenmann & Eigenmann 1890

Range—Magdalena Bay, Baja California to Eureka, California.
Greatest depth taken and maximum size—150 fathoms; 22 inches.
Body color—Pinkish-red; fins, pink. *Young* with light-olive on back.
Mouth and gill cavities—Pinkish-white, sometimes with one or two patches of light-dusky.
Peritoneum—Silvery white in large specimens; silvery white with black dots in small specimens.
Top of head, at mid-orbits—Strongly convex, with a slight flattening next to each orbit. Young specimens, three to four inches long, have the top of head nearly flat, or only slightly convex, with a pair of low frontal ridges.
Spines on top of head—In adult fish, all are obsolete, but in young specimens the nasal, supraocular or parietal spines may be weakly present.
Parietal ridges—Low and thin.
The five preopercular spines—Moderately strong, sharp, usually radially-directed; the second and third spines from the top usually the longest.
The two opercular spines—Moderately strong and sharp.
Supracleithral and cleithral spines—Supracleithral weak, nearly obsolete; the cleithral moderately strong.
Lower margin of suborbital bone—Two weak spines present or absent in adults; two small, sharp spines usually present in specimens under 10 inches.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—Moderately strong, sharp, somewhat forward-projecting knob present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under mid-orbit.
Maxillaries—Well covered with scales.
Mandibles—Well covered with scales.
Branchiostegals—Well covered with scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, but do not reach anus.
Second anal fin spine—Only slightly thicker than the third. Tip of second spine does not reach tip of third by nearly one-quarter orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Slanted posteriorly.

Sebastodes goodei Eigenmann & Eigenmann 1890

Measurement	Frequency of measurement into: Standard length	Head length	Frequency of orbit width into measurement
Length of head	2.7 – 2.9	--- ---	--- ---
Depth of body at origin of ventral fins	3.3 – 3.5	1.2 – 1.3	3.3 – 3.6
Depth of body at origin of anal fin	4.2 – 4.6	1.5 – 1.6	2.5 – 2.9
Length of base of anal fin	7.0 – 8.1	2.4 – 2.9	1.4 – 1.8
Length of snout	9.3 –10.2	3.4 – 3.7	1.1 – 1.3
Width of orbit	11.2 –12.3	4.0 – 4.4	--- ---
Width of interorbital space	--- ---	3.7 – 4.0	1.1 – 1.2
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	6.0 – 6.6	2.2 – 2.3	1.8 – 2.3
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.4
Thickness of body	--- ---	--- ---	1.7 – 1.8
Width of base of pectoral fin	--- ---	--- ---	0.8 – 0.9
Longest pectoral fin ray	4.1 – 4.7	1.5 – 1.7	2.6 – 2.9
Longest ventral fin ray	--- ---	2.1 – 2.2	1.9 – 2.1
Length of ventral fin spine	--- ---	2.8 – 3.6	1.2 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	14.8 –18.0	5.1 – 6.4	0.6 – 0.8
Length of third anal fin spine	--- ---	--- ---	0.6 – 0.8
Longest anal fin ray	9.4 –11.1	3.3 – 4.0	1.0 – 1.3
Longest dorsal fin spine	7.1 – 8.5	2.5 – 3.0	1.4 – 1.6
Longest dorsal fin ray	7.8 – 9.6	2.9 – 3.4	1.2 – 1.5
Least depth of caudal peduncle	11.4 –12.5	4.2 – 4.5	0.9 – 1.0
Ventral length of caudal peduncle	--- ---	1.6 – 1.8	2.3 – 2.6
Dorsal length of caudal peduncle	--- ---	2.4 – 2.6	1.6 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.1 – 0.2
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	14 (occas. 13)
Number of rays in anal fin	8 (rarely 9)
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 (occas. 7 or 9)
Number of rakers on first gill arch	35–39
Number of pores in lateral line	50–56
Diagonal rows of scales below lateral line	60–77

Number of specimens examined	6, plus 15
Size of specimens examined	7.5 – 20.5 inches

OTHER COMMON NAMES

Johnies, Johnny cod

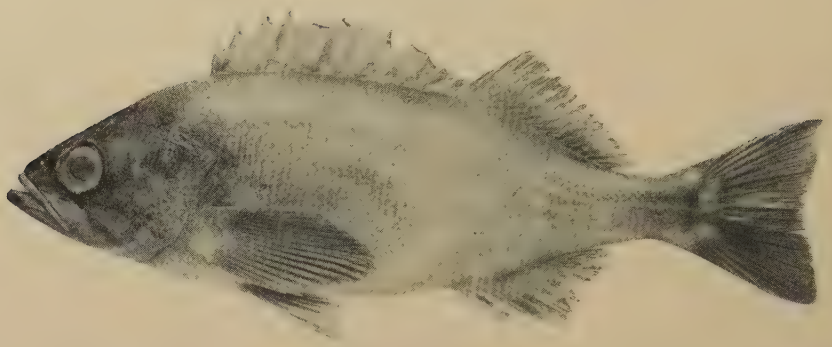

FIGURE 12

WIDOW ROCKFISH
Sebastodes entomelas (Jordan & Gilbert 1880)

Range—La Jolla, California to S. E. Alaska.
Greatest depth taken and maximum size—120 fathoms; 20½ inches.
Body color—Uniformly dusky-brown, with traces of light yellow; fins dusky, tinged with brown except for caudal. Specimens under 10 inches length with vague streaks of orange.
Mouth and gill cavity—White, with dusky areas; usually a dark splotch on underside of opercle.
Peritoneum—Dark gray with black dots, or black.
Top of head, at mid-orbits—Strongly convex.
Spines on top of head—Nearly all obsolete. Occasionally the tips of the nasal, preocular and parietals will be weakly present. Specimens under about eight inches length have the nasal, preocular, supraocular, postocular, tympanic and parietal spines present, but these delicate.
Parietal ridges—Low and thin.
The five preopercular spines—Moderately strong and radially-directed, or the upper two to four are directed backward.
The two opercular spines—Moderately long, thin and sharp.
Supracleithral and cleithral spines—Both moderately strong.
Lower margin of suborbital bone—Spines absent.
Lower posterior edge of gill cover—Small spines present or absent.
Symphyseal knob—A knob is absent, but there is a slight thickening at the tip of lower jaw.
Raised patch of teeth on tip of lower jaw—A slight or moderate elevation is present, but not a distinctly raised patch.
End of maxillary—Under mid-orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, but do not reach anus.
Second anal fin spine—Usually only slightly thicker than the third, occasionally twice as thick. Tip of the second spine fails to reach tip of third, except in specimens under about 8 inches length, where the tip of second may reach to tip, or slightly beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Slanted posteriorly.

Sebastodes entomelas (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	3.0 – 3.1	--- ---	--- ---
Depth of body at origin of ventral fins	3.1 – 3.2	1.0 – 1.1	3.7 – 4.4
Depth of body at origin of anal fin	3.7 – 4.0	1.2 – 1.3	3.0 – 3.7
Length of base of anal fin	6.1 – 6.9	2.0 – 2.2	1.9 – 2.2
Length of snout	11.0 –11.8	3.6 – 3.9	1.0 – 1.2
Width of orbit	11.5 –13.8	3.8 – 4.5	--- ---
Width of interorbital space	--- ---	3.3 – 3.9	1.0 – 1.4
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	7.2 – 7.5	2.4 – 2.5	1.5 – 1.9
Amount that lower jaw projects	--- ---	--- ---	0.2
Thickness of body	--- ---	--- ---	1.7 – 2.3
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.3
Longest pectoral fin ray	3.6 – 3.9	1.2 – 1.3	3.0 – 3.8
Longest ventral fin ray	--- ---	1.8 – 2.0	2.0 – 2.5
Length of ventral fin spine	--- ---	2.4 – 3.1	1.4 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.7
Length of second anal fin spine	7.9 –14.2	2.6 – 4.5	1.0 – 1.4
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.3
Longest anal fin ray	6.8 – 7.4	2.2 – 2.4	1.6 – 2.0
Longest dorsal fin spine	8.1 –10.3	2.7 – 3.3	1.4 – 1.5
Longest dorsal fin ray	7.5 – 8.6	2.4 – 2.8	1.4 – 1.8
Least depth of caudal peduncle	10.5 –11.9	3.4 – 3.9	1.0 – 1.3
Ventral length of caudal peduncle	--- ---	1.6 – 1.7	2.3 – 2.9
Dorsal length of caudal peduncle	--- ---	2.1 – 2.3	1.6 – 2.0
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.7

Number of rays in dorsal fin	15 or 16 (occas. 14)
Number of rays in anal fin	8
Number of rays in each pectoral fin	17–19
Unbranched rays in each pectoral fin	8–10
Number of rakers on first gill arch	35–37
Number of pores in lateral line	52–54
Diagonal rows of scales below lateral line	60–66

Number of specimens examined	6, plus 11
Size of specimens examined	7.2 – 20.5 inches

OTHER COMMON NAMES

Viuva

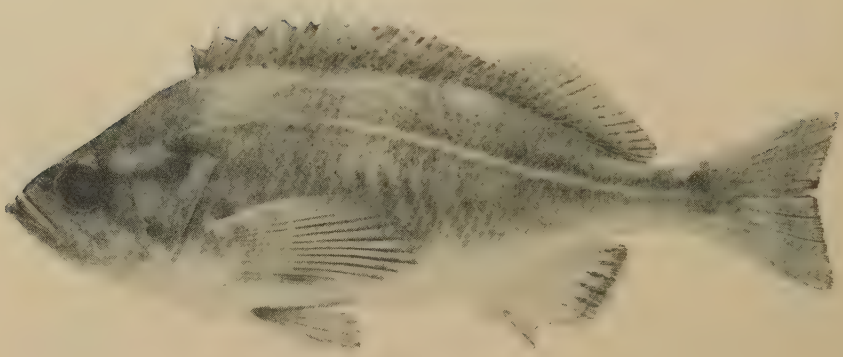

FIGURE 13

SPECKLED ROCKFISH

Sebastodes ovalis Ayres 1862

Range—Santo Tomas, Baja California to San Francisco, California.
Greatest depth taken and maximum size—200 fathoms; 22 inches.
Body color—Light brown or tan with dark brown spotting and vague mottling on back and sides; tips of jaws blackened; membranes of lower fins blackened.
Mouth and gill cavities—In small specimens these cavities are white with black dots; in large specimens the gill cavity is often considerably blotched with black; a dark blotch on underside of opercle.
Peritoneum—Dark gray or brown with black dots, or black.
Top of head, at mid-orbits—Moderately or strongly convex, a flattening near orbits.
Spines on top of head—Small and weak, in some cases obsolete. Nasal, preocular, supraocular, tympanic and parietal may be weakly present, but in some specimens the supraocular, tympanic and parietals are obsolete. *Coronal and nuchal spines always absent.*
Parietal ridges—Low and thin.
The five preopercular spines—Moderately strong, sharp and all tending to be directed backward; usually the second and third from top are longest.
The two opercular spines—Moderately long, sharp, the lower occasionally bifid.
Supracleithral and cleithral spines—Supracleithral not always present; cleithral small.
Lower margin of suborbital bone—Two small, sharply triangular spines present, the anterior one sometimes bifid.
Lower posterior edge of gill cover—Rarely a single spine present.
Symphyseal knob—A low knob, or a thickening of tip of lower jaw is present.
Raised patch of teeth on tip of lower jaw—In small specimens there is a slight elevation at tip of lower jaw, but in large specimens a raised patch is often present.
End of maxillary—Under mid-orbit, or slightly less.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus, or one-half orbit width less.
Second anal fin spine—Usually twice as thick as third. Tip of second may reach tip of third, or slightly less (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Slanted posteriorly.

Sebastodes ovalis Ayres 1862

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.7 – 3.0	--- ---	--
Depth of body at origin of ventral fins	2.7 – 3.3	0.9 – 1.1	3.5 – 4.5
Depth of body at origin of anal fin	3.3 – 4.4	1.1 – 1.4	2.6 – 3.7
Length of base of anal fin	5.4 – 6.7	1.8 – 2.2	1.8 – 2.3
Length of snout	11.2 –12.5	3.8 – 4.5	0.9 – 1.1
Width of orbit	10.7 –12.6	3.6 – 4.2	--- ---
Width of interorbital space	--- ---	3.4 – 4.0	0.8 – 1.2
Width of suborbital bone	--- ---	--- ---	0.2
Length of upper jaw	7.0 – 8.0	2.3 – 2.7	1.5 – 1.7
Amount that lower jaw projects	--- ---	--- ---	0.2 0.4
Thickness of body	--- ---	--- ---	1.5 – 2.1
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.3
Longest pectoral fin ray	3.2 – 4.1	1.1 – 1.3	3.1 – 3.8
Longest ventral fin ray	--- ---	1.7 – 2.1	2.0 – 2.3
Length of ventral fin spine	--- ---	2.3 – 3.0	1.3 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.6 – 0.8
Length of second anal fin spine	6.7 – 9.5	2.3 – 3.3	1.2 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.4
Longest anal fin ray	6.9 – 8.0	2.3 – 2.8	1.4 – 1.8
Longest dorsal fin spine	8.0 – 9.4	2.6 – 3.3	1.2 – 1.5
Longest dorsal fin ray	8.0 –10.1	2.7 – 3.4	1.2 – 1.5
Least depth of caudal peduncle	10.9 –13.3	3.6 – 4.7	0.8 – 1.1
Ventral length of caudal peduncle	--- ---	1.6 – 2.1	1.9 – 2.6
Dorsal length of caudal peduncle	--- ---	2.1 – 2.9	1.4 – 2.0
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.6

Number of rays in dorsal fin	14–16 (occas. 13)
Number of rays in anal fin	8–9 (occas. 7)
Number of rays in each pectoral fin	18 (occas. 17 or 19)
Unbranched rays in each pectoral fin	7–9 (occas. fewer)
Number of rakers on first gill arch	31–37
Number of pores in lateral line	47–55
Diagonal rows of scales below lateral line	58–70

Number of specimens examined	22
Size of specimens examined	7.2 – 19.0 inches

OTHER COMMON NAMES

Widow rockfish, zipola, brownfish, beccafico

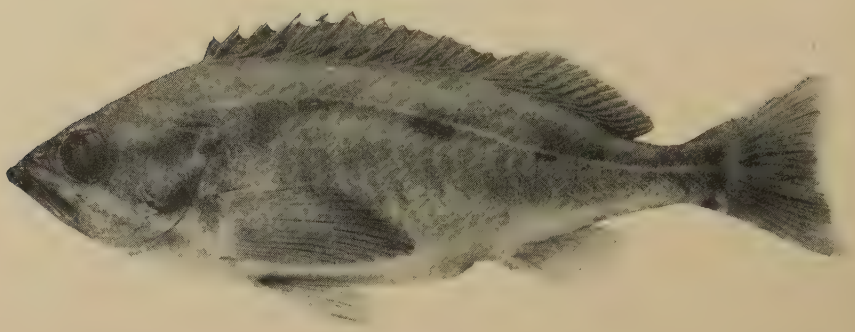

FIGURE 14

SQUARESPOT ROCKFISH
Sebastodes hopkinsi Cramer 1895

Range—Santo Tomas, Baja California to Monterey, California.
Greatest depth taken and maximum size—100 fathoms; 11 inches.
Body color—Dusty-tan, with several, angular, dark-brown blotches on back.
Mouth and gill cavities—White, tinged with yellow, and dusky stippling.
Peritoneum—Dark brown with black dots, or black.
Top of head at mid-orbits—Strongly convex.
Spines on top of head—Small and weak, in some cases obsolete. Nasal, preocular, supraocular, postocular, tympanic and parietals may be weakly present, but in some specimens the supraocular, tympanic and parietals are obsolete. *Coronal and nuchal spines always absent.*
Parietal ridges—Weakly evident.
The five preopercular spines—Moderately strong, sharp, all tending to be directed backward; usually the second and third from top are longest.
The two opercular spines—Moderately long and sharp, the lowermost sometimes bifid.
Supracleithral and cliethral spines—Supracleithral spine not always present; cleithral small.
Lower margin of suborbital bone—Usually with two rounded projections, but occasionally these are sharply triangular.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A small, pointed, downward-projecting knob usually present.
Raised patch of teeth on tip of lower jaw—Present.
End of maxillary—Under anterior of pupil or mid-orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals may extend to tips of ventrals, or a short distance beyond. Tip of pectoral fails to reach anus by nearly an orbit width.
Second anal fin spine—Usually twice as thick as third. The tip of the second extends slightly beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Strong posterior slant.

Sebastodes hopkinsi Cramer 1895

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	3.0 – 3.2	--- ---	--- ---
Depth of body at origin of ventral fins	3.1 – 3.4	1.0 – 1.1	3.4 – 3.8
Depth of body at origin of anal fin	4.0 – 4.5	1.3 – 1.4	2.6 – 3.0
Length of base of anal fin	7.1 – 7.7	2.3 – 2.5	1.5 – 1.7
Length of snout	11.7 –13.0	3.9 – 4.2	0.9 – 1.0
Width of orbit	11.0 –12.5	3.7 – 4.0	--- ---
Width of interorbital space	--- ---	4.1 – 4.5	0.9 – 1.0
Width of suborbital bone	--- ---	--- ---	0.2
Length of upper jaw	7.8 – 8.1	2.5 – 2.7	1.4 – 1.6
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.6 – 1.8
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.1
Longest pectoral fin ray	3.5 – 3.8	1.2	3.0 – 3.4
Longest ventral fin ray	--- ---	1.7 – 1.8	2.1 – 2.3
Length of ventral fin spine	--- ---	2.3 – 2.4	1.6 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.7
Length of second anal fin spine	7.1 – 8.9	2.4 – 2.8	1.4 – 1.6
Length of third anal fin spine	--- ---	--- ---	1.0 – 1.2
Longest anal fin ray	7.4 – 8.3	2.5 – 2.7	1.4 – 1.5
Longest dorsal fin spine	8.1 – 9.3	2.7 – 3.0	1.3 – 1.4
Longest dorsal fin ray	8.2 – 9.8	2.8 – 3.1	1.2 – 1.4
Least depth of caudal peduncle	11.6 –12.8	3.8 – 4.2	0.9 – 1.0
Ventral length of caudal peduncle	--- ---	1.5 – 1.7	2.2 – 2.7
Dorsal length of caudal peduncle	--- ---	2.3 – 2.6	1.6 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.5

Number of rays in dorsal fin	14 or 15
Number of rays in anal fin	7 (occas. 6)
Number of rays in each pectoral fin	17 (occas. 16)
Unbranched rays in each pectoral fin	8 or 9
Number of rakers on first gill arch	36–39
Number of pores in lateral line	49–55
Diagonal rows of scales below lateral line	57–67

Number of specimens examined	6, plus 4
Size of specimens examined	8.5 – 11.0 inches

OTHER COMMON NAMES

Smallmouth rockfish

FIGURE 15

BLUE ROCKFISH

Sebastodes mystinus (Jordan & Gilbert 1880)

Range—Santo Tomas, Baja California to Bering Sea.
Greatest depth taken and maximum size—50 fathoms; 21 inches.
Body color—Bluish-black, mottled with paler color on sides; fins dark. Young specimens of less than about five inches length, gray overlaid with irregular, reddish streaks; fine black flecks over body.
Mouth and gill cavities—Dusky-white, a dark blotch on underside of opercle.
Peritoneum—In specimens less than about nine inches length, the peritoneum is light gray with black dots, while in those from about 9 to 13 inches it is black, and in larger specimens the color begins to fade, so that in the largest fish it may be white with a few black flecks or dusky patches.
Top of head, at mid-orbits—Strongly and evenly convex.
Spines on top of head—The tips of the nasals are weakly present, and occasionally minute preocular spines are present, but other spines are usually obsolete.
Parietal ridges—Weakly evident.
The five preopercular spines—Moderately strong and sharp; the upper four usually directed backward, or occasionally radially-directed.
The two opercular spines—Short and sharp.
Supracleithral and cleithral spines—Supracleithral weak or absent; cleithral moderately strong.
Lower margin of suborbital bone—Occasionally a single triangular spine present.
Lower posterior edge of gill cover—Small spines present.
Symphyseal knob—Absent, or present only to a slight degree.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under mid-orbit to rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, occasionally reaching anus, but usually slightly less.
Second anal fine spine—Usually only slightly thicker than the third. Tip of the second fails to reach to tip of third by one-quarter to one-half orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or with slight posterior slant.

Sebastodes mystinus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	3.0 – 3.1	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 2.9	0.9 – 1.0	4.3 – 4.8
Depth of body at origin of anal fin	3.3 – 3.6	1.0 – 1.2	3.5 – 4.1
Length of base of anal fin	5.4 – 6.4	1.8 – 2.1	2.1 – 2.4
Length of snout	10.9 –12.0	3.5 – 4.0	1.0 – 1.2
Width of orbit	12.2 –13.7	4.1 – 4.9	--- ---
Width of interorbital space	--- ---	3.2 – 3.5	1.2 – 1.3
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	7.0 – 7.5	2.3 – 2.4	1.7 – 1.9
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.2
Thickness of body	--- ---	--- ---	2.2 – 2.5
Width of base of pectoral fin	--- ---	--- ---	1.2 – 1.4
Longest pectoral fin ray	3.3 – 3.6	1.1 – 1.2	3.5 – 4.1
Longest ventral fin ray	--- ---	1.5 – 1.7	2.5 – 2.8
Length of ventral fin spine	--- ---	2.2 – 2.6	1.7 – 1.9
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.7
Length of second anal fin spine	8.9 –11.9	2.9 – 4.0	1.0 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.5
Longest anal fin ray	5.8 – 6.4	1.9 – 2.1	2.0 – 2.3
Longest dorsal fin spine	8.3 – 9.0	2.7 – 2.9	1.4 – 1.6
Longest dorsal fin ray	6.8 – 8.0	2.2 – 2.6	1.6 – 2.0
Least depth of caudal peduncle	8.9 – 9.6	2.9 – 3.1	1.3 – 1.5
Ventral length of caudal peduncle	--- ---	1.7 – 1.8	2.3 – 2.6
Dorsal length of caudal peduncle	--- ---	2.3 – 2.7	1.6 – 1.9
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.7

Number of rays in dorsal fin	15 or 16 (occas. 17)
Number of rays in anal fin	8 or 9 (occas. 10)
Number of rays in each pectoral fin	17 or 18
Unbranched rays in each pectoral fin	9 or 10 (occas. 8)
Number of rakers on first gill arch	33–38
Number of pores in lateral line	49–56
Diagonal rows of scales below lateral line	50–56

Number of specimens examined	6, plus 14
Size of specimens examined	9.7 – 13.2 inches

OTHER COMMON NAMES

Priestfish, bluefish, blue perch

FIGURE 16

BLACK ROCKFISH

Sebastodes melanops (Girard 1856)

Range—San Miguel Island, California to S. E. Alaska.
Greatest depth taken and maximum size—60 fathoms; 20 inches.
Body color—Black on back, becoming gray mottled with black on sides; fins dark, except ventral fins lighter-colored; upon close examination, black spots are present on basal portion of dorsal fin, in specimens over about 12 inches length. *Young* specimens under about seven inches gray with brown spotting and mottling; black blotch on posterior of spinous dorsal fin.
Mouth and gill cavities—Light gray; a dark blotch on underside of opercle.
Peritoneum—Silvery white, sometimes with a few black flecks.
Top of head, at mid-orbits—Strongly convex.
Spines on top of head—Tips of the nasals weakly present, but remaining spines usually obsolete; occasionally, weak preocular or postoculars are present.
Parietal ridges—Weakly apparent.
The five preopercular spines—Radially directed, or the upper two spines are directed backward.
The two opercular spines—Moderately strong and sharp, the upper often longer.
Supracleithral and cleithral spines—Weak, the supracleithral usually absent.
Lower margin of suborbital bone—Spines absent.
Lower posterior edge of gill cover—Spines usually absent.
Symphyseal knob—Absent, or present only to a slight degree.
Raised patch of teeth on tip of lower jaw—Slightly to moderately elevated, but not as a distinct patch.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals usually about to tips of ventrals, usually not reaching anus.
Second anal fin spine—Only slightly thicker than third. Tip of the second fails to reach tip of third by about one-third of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Lower corner of fin slightly rounded, with an anterior slant above. Specimens under six inches length, with convex profile.

Sebastodes melanops (Girard 1856)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.7 – 2.9	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.1	0.9 – 1.1	3.3 – 4.6
Depth of body at origin of anal fin	3.2 – 3.7	1.1 – 1.3	2.8 – 3.7
Length of base of anal fin	5.4 – 6.7	1.9 – 2.3	1.7 – 2.1
Length of snout	10.3 –11.8	3.7 – 4.0	1.0 – 1.2
Width of orbit	10.2 –12.3	3.7 – 4.3	--- ---
Width of interorbital space	--- ---	3.9 – 4.4	0.8 – 1.1
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	5.5 – 6.2	2.0 – 2.1	1.8 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.6 – 2.2
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.2
Longest pectoral fin ray	3.8 – 4.2	1.3 – 1.5	2.6 – 3.1
Longest ventral fin ray	--- ---	1.5 – 1.8	2.1 – 2.8
Length of ventral fin spine	--- ---	2.4 – 3.2	1.3 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.6
Length of second anal fin spine	8.5 –12.1	3.0 – 4.1	1.0 – 1.3
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.4
Longest anal fin ray	4.9 – 6.1	1.8 – 2.1	1.9 – 2.3
Longest dorsal fin spine	7.0 – 8.2	2.5 – 2.8	1.3 – 1.6
Longest dorsal fin ray	5.7 – 7.6	2.0 – 2.6	1.6 – 2.1
Least depth of caudal peduncle	8.0 – 9.2	2.8 – 3.2	1.2 – 1.5
Ventral length of caudal peduncle	--- ---	1.7 – 1.9	2.1 – 2.4
Dorsal length of caudal peduncle	--- ---	2.5 – 2.8	1.4 – 1.7
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.8
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	14 or 15 (occas. 13 or 16)
Number of rays in anal fin	8 (occas. 7 or 9)
Number of rays in each pectoral fin	18 or 19 (occas. 20)
Unbranched rays in each pectoral fin	9–11
Number of rakers on first gill arch	34–39
Number of pores in lateral line	46–53
Diagonal rows of scales below lateral line	50–55

Number of specimens examined	9, plus 1
Size of specimens examined	8.7 – 18.5 inches

OTHER COMMON NAMES

Black snapper, black bass, bass rockfish, nero, cherna

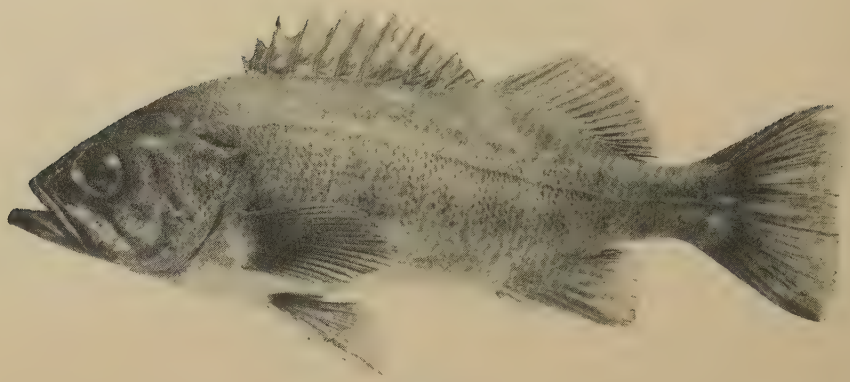

FIGURE 17

YELLOWTAIL ROCKFISH
Sebastodes flavidus Ayres 1862

Range—San Diego, California to Vancouver Island, B. C.
Greatest depth taken and maximum size—80 fathoms; 26 inches.
Body color—Grayish brown becoming light gray on sides and white ventrally; sides finely speckled with brown; several vague light blotches on back. Specimens of less than about 12 inches length with a black blotch on the posterior portion of the spinous dorsal fin. Fins dusky and yellow; lower rays of pectoral fin tinged with pink.
Mouth and gill cavities—Light gray, sometimes tinged with yellow.
Peritoneum—Silvery white. Young with black speckling on peritoneum.
Top of head, at mid-orbits—Strongly and rather evenly convex.
Spines on top of head—Obsolete, except for weak nasal spines.
Parietal ridges—Weakly present.
The five preopercular spines—Moderately strong and sharp, all radially directed, or with the upper two directed backward.
The two opercular spines—Moderately strong, thin and sharp.
Supracleithral and cleithral spines—Both these spines are weak, the supracleithral sometimes not apparent.
Lower margin of suborbital bone—Without spines.
Posterior edge of gill cover opposite preopercular spines—Weak spines may be present or absent.
Symphyseal knob—A small, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A slightly or moderately raised patch is present.
End of maxillary—Under rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals about to tips of ventrals, but not reaching anus by about one-half of orbit width.
Second anal fin spine—Only slightly thicker than third. Tip of second does not reach tip of third by one-third to one-half of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Vertical, or with a slight anterior slant.

Sebastodes flavidus Ayres 1862

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.7 – 2.9	--- ---	--- ---
Depth of body at origin of ventral fins	2.9 – 3.3	1.0 – 1.2	3.0 – 4.3
Depth of body at origin of anal fin	3.4 – 3.7	1.2 – 1.4	2.5 – 3.5
Length of base of anal fin	5.7 – 6.4	2.0 – 2.3	1.7 – 2.0
Length of snout	10.0 –10.9	3.6 – 3.8	0.9 – 1.3
Width of orbit	9.7 –12.8	3.6 – 4.5	--- ---
Width of interorbital space	--- ---	3.7 – 4.3	0.8 – 1.2
Width of suborbital bone	--- ---	--- ---	0.1 – 0.3
Length of upper jaw	5.7 – 6.3	2.1 – 2.2	1.7 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.7 – 2.0
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.1
Longest pectoral fin ray	3.8 – 4.3	1.4 – 1.5	2.5 – 3.1
Longest ventral fin ray	--- ---	1.7 – 1.9	1.9 – 2.6
Length of ventral fin spine	--- ---	2.5 – 3.0	1.4 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	9.8 –13.2	3.3 – 4.7	0.9 – 1.2
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	5.3 – 5.9	1.8 – 2.1	1.8 – 2.4
Longest dorsal fin spine	6.8 – 7.8	2.5 – 2.8	1.5 – 1.7
Longest dorsal fin ray	5.8 – 6.7	2.1 – 2.3	1.6 – 2.2
Least depth of caudal peduncle	9.0 – 9.6	3.2 – 3.4	1.1 – 1.3
Ventral length of caudal peduncle	--- ---	1.7 – 2.0	1.9 – 2.6
Dorsal length of caudal peduncle	--- ---	2.4 – 2.6	1.4 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.6

Number of rays in dorsal fin	14 or 15
Number of rays in anal fin	8 (occas. 7 or 9)
Number of rays in each pectoral fin	18 (occas. 17)
Unbranched rays in each pectoral fin	9 (occas. 8 or 10)
Number of rakers on first gill arch	35–38
Number of pores in lateral line	49–55
Diagonal rows of scales below lateral line	55–60

Number of specimens examined	6, plus 20
Size of specimens examined	4.5 – 20.5 inches

OTHER COMMON NAMES

Green snapper, giola, gialoto, cherne

FIGURE 18

OLIVE ROCKFISH

Sebastodes serranoides Eigenmann & Eigenmann 1890

Range—Cape Colnett, Baja California to San Francisco, California.
Greatest depth taken and maximum size—80 fathoms; 21 inches.
Body color—Dark, olive-gray dorsally becoming a lighter gray on lower sides and white, ventrally; sides finely speckled with dark gray; several light blotches on back. Fins, dark olive, with some yellow; lower rays of pectoral fins not tinged with pink. Specimens of less than about 12 inches length, with a black blotch on the posterior section of the spinous dorsal.
Mouth and gill cavities—Light gray, sometimes tinged with yellow.
Peritoneum—Silvery white. Young with black speckling on peritoneum.
Top of head, at mid-orbits—Strongly and rather evenly convex (elevated).
Spines on top of head—Obsolete, except that occasionally nasal spines will be weakly present.
Parietal ridges—Weakly present.
The five preopercular spines—Moderately strong and sharp; all radially directed, or the upper two to four directed backward.
The two opercular spines—Moderately strong, thin and sharp.
Supracleithral and cleithral spines—Both weak, the supracleithral sometimes not apparent.
Lower margin of suborbital bone—Without spines.
Lower posterior edge of gill cover—Without spines.
Symphyseal knob—Usually absent, but occasionally a small, downward-projecting knob.
Raised patch of teeth on tip of lower jaw—A moderate elevation may be present.
End of Maxillary—Under rear of pupil, or rear of orbit.
Maxillaries—Well covered with scales.
Mandibles—Well covered with scales.
Branchiostegals—Well covered with scales.
Ends of pectoral and ventral fins—Tips of pectorals reach tips of ventrals or slightly beyond, but usually not reaching anus.
Second anal fin spine—Only slightly thicker than third. Tip of second does not reach tip of third by about one-third orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Vertical, or with a slight posterior slant.

Sebastodes serranoides Eigenmann & Eigenmann 1890

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.8 – 3.0	--- ---	--- ---
Depth of body at origin of ventral fins	2.9 – 3.4	1.0 – 1.2	3.2 – 4.4
Depth of body at origin of anal fin	3.6 – 3.9	1.2 – 1.4	2.8 – 3.5
Length of base of anal fin	5.5 – 6.1	1.8 – 2.1	2.0 – 2.3
Length of snout	9.8 –11.5	3.4 – 4.1	1.0 – 1.3
Width of orbit	10.0 –12.7	3.9 – 4.4	--- ---
Width of interorbital space	--- ---	3.8 – 4.2	0.9 – 1.1
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	5.5 – 6.6	2.0 – 2.1	1.9 – 2.2
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.8 – 2.4
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.0
Longest pectoral fin ray	3.8 – 4.5	1.3 – 1.5	2.8 – 3.3
Longest ventral fin ray	--- ---	1.7 – 1.9	2.3 – 2.5
Length of ventral fin spine	--- ---	2.5 – 3.1	1.4 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	10.1 –14.8	3.5 – 5.1	0.9 – 1.1
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.2
Longest anal fin ray	5.7 – 6.6	2.0 – 2.2	1.9 – 2.2
Longest dorsal fin spine	8.2 – 9.4	2.8 – 3.1	1.4 – 1.5
Longest dorsal fin ray	6.6 – 7.4	2.3 – 2.5	1.7 – 1.8
Least depth of caudal peduncle	8.7 – 9.8	3.0 – 3.4	1.2 – 1.4
Ventral length of caudal peduncle	--- ---	1.7 – 1.9	2.1 – 2.5
Dorsal length of caudal peduncle	--- ---	2.4 – 2.7	1.4 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.6

Number of rays in dorsal fin	15–17
Number of rays in anal fin	9 (occas. 8 or 10)
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 or 9 (occas. 10)
Number of rakers on first gill arch	32–36
Number of pores in lateral line	50–56
Diagonal rows of scales below lateral line	57–66

Number of specimens examined	7, plus 5
Size of specimens examined	7.2 – 14.5 inches

OTHER COMMON NAMES

Kelp yellowtail, kelp salmon, bass rockfish, sugar bass

FIGURE 19

CANARY ROCKFISH

Sebastodes pinniger (Jordan & Gilbert 1880)

Range—Cape Colnett, Baja California to Dixon Entrance, B. C.
Greatest depth taken and maximum size—110 fathoms; 30 inches.
Body color—Gray, mottled with orange; fins orange. In specimens less than about 12 inches length, there is a black blotch on the membranes of the posterior portion of the spinous dorsal.
Mouth and gill cavities—White, with some pink and light dusky; a dark blotch on underside of opercle.
Peritoneum—Silvery white; in specimens less than about 12 inches length, black dots are present on the white peritoneum.
Top of head, at mid-orbits—Strongly convex, with a flattening near orbits. Slightly convex in specimens less than about nine inches length.
Spines on top of head—Nasal, preocular,, supraocular, postocular, tympanic and parietals present, but small. *Coronal and nuchal spines absent.*
Parietal ridges—Low and thin.
The five preopercular spines—Strong and sharp, the second and third from top usually longer. These spines tend to be radially-directed, but occasionally most are directed rather backward.
The two opercular spines—Strong and sharp, the uppermost often longer.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—A small lobe anteriorly, a larger, sharply triangular spine posteriorly.
Lower posterior edge of gill cover—Spines present or absent.
Symphyseal knob—A low, broad, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales (these smooth to the touch, as opposed to the similar species *S. miniatus*, in which they are rough).
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals reach about to tips of ventrals, both usually reaching to anus.
Second anal fin spine—Only a little thicker than the third. Tip of the second fails to reach tip of third, but only slightly less in small specimens (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Strong anterior slant.

Sebastodes pinniger (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into: Standard length	Head length	Frequency of orbit width into measurement
Length of head	2.7 - 2.8	---	---
Depth of body at origin of ventral fins	2.7 - 3.3	1.0 - 1.1	3.6 - 4.2
Depth of body at origin of anal fin	3.3 - 3.7	1.2 - 1.4	2.8 - 3.4
Length of base of anal fin	6.8 - 7.1	2.5 - 2.7	1.4 - 1.7
Length of snout	10.3 -10.8	3.8 - 4.1	1.0 - 1.1
Width of orbit	10.0 -11.9	3.8 - 4.3	---
Width of interorbital space	---	4.3 - 4.8	0.8 - 1.0
Width of suborbital bone	---	---	0.2 - 0.3
Length of upper jaw	5.5 - 5.7	2.0 - 2.1	1.8 - 2.1
Amount that lower jaw projects	---	---	0.2 - 0.3
Thickness of body	---	---	1.6 - 2.1
Width of base of pectoral fin	---	---	0.8 - 1.0
Longest pectoral fin ray	3.4 - 3.7	1.2 - 1.4	2.7 - 3.4
Longest ventral fin ray	---	1.5 - 1.6	2.3 - 2.8
Length of ventral fin spine	---	2.6 - 3.2	1.3 - 1.6
Length of first anal fin spine	---	---	0.5 - 0.7
Length of second anal fin spine	7.1 - 9.3	2.7 - 3.3	1.3 - 1.5
Length of third anal fin spine	---	---	1.3 - 1.7
Longest anal fin ray	4.5 - 5.0	1.7 - 1.9	2.0 - 2.4
Longest dorsal fin spine	6.2 - 6.9	2.2 - 2.6	1.6 - 1.7
Longest dorsal fin ray	5.8 - 6.1	2.1 - 2.3	1.6 - 2.0
Least depth of caudal peduncle	8.3 - 9.2	3.2 - 3.4	1.1 - 1.3
Ventral length of caudal peduncle	---	1.7 - 1.8	2.1 - 2.6
Dorsal length of caudal peduncle	---	2.4 - 2.7	1.4 - 1.8
Posterior of anus to origin of anal fin	---	---	0.4 - 0.6
Longest raker on first gill arch	---	---	0.6 - 1.0

Number of rays in dorsal fin	14 or 15
Number of rays in anal fin	7
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	41–45
Number of pores in lateral line	39–43
Diagonal rows of scales below lateral line	43–50

Number of specimens examined	7, plus 13
Size of specimens examined	8.5 – 16.0 inches

OTHER COMMON NAMES

Orange rockfish, codalargo, yellow snapper. filione, fantail, red rock cod

FIGURE 20

VERMILION ROCKFISH

Sebastodes miniatus (Jordan & Gilbert 1880)

Range—Gaudalupe Island, Baja California to Vancouver Island, B. C.
Greatest depth taken and maximum size—110 fathoms; 30 inches.
Body color—Dark red, mottled with gray on sides; fins red. Specimens less than about 12 inches length are uniformly dark red, and nearly all fins are edged with black.
Mouth and gill cavities—Pink, with considerable duskiness in gill cavity; a dark blotch on underside of gill cover.
Peritoneum—Silvery white (with scattered black flecks in smaller specimens).
Top of head, at mid-orbits—Strongly convex, with a flattening near orbits. Nearly flat in specimens less than about nine inches length.
Spines on top of head—Small nasal, preocular, supraocular, postocular, tympanic, and partietals present, except nuchal spines occasionally present, *coronals absent.*
Parietal ridges—Low and thin.
The five preopercular spines—Strong and sharp, the second and third from top usually longer. The spines tend to be radially-directed, but sometimes the upper two or three are directed backward.
The two opercular spines—Strong and sharp, the uppermost often longer.
Supracleithral and cleithral spines—Both present, strong.
Lower margin of suborbital bone—Two, sharply triangular spines present.
Lower posterior edge of gill cover—Spines present or absent.
Symphyseal knob—A low, broad, downward-projecting knob is present.
Raised patch of teeth at tip of lower jaw—Present.
End of maxillary—Under rear of pupil or rear of orbit, in fish over about nine inches length; usually to under mid-orbit in smaller specimens.
Maxillaries—Covered with scales (these rough to the touch, as opposed to the similar species *S. pinniger*, in which they are smooth).
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals may or may not reach tips of ventrals. Tips of pectorals may not reach anus, or they may extend slightly beyond.
Second anal fin spine—Only slightly thicker than third. In specimens less than about nine inches length tip of the second spine may reach tip of third, but in larger fish tip of second fails to reach tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Lower corner rounded, with an anterior slant above.

Sebastodes miniatus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.9	1.0 – 1.1	3.0 – 4.4
Depth of body at origin of anal fin	3.1 – 4.0	1.1 – 1.4	2.1 – 3.6
Length of base of anal fin	6.2 – 7.1	2.3 – 2.7	1.2 – 1.8
Length of snout	9.7 –11.0	3.7 – 4.1	0.8 – 1.2
Width of orbit	8.5 –11.8	3.2 – 4.5	--- ---
Width of interorbital space	--- ---	4.1 – 4.9	0.6 – 1.0
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	5.2 – 5.7	2.0 – 2.1	1.5 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.6 – 2.3
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.1
Longest pectoral fin ray	3.2 – 3.8	1.2 – 1.4	2.4 – 3.5
Longest ventral fin ray	--- ---	1.4 – 1.6	2.0 – 3.2
Length of ventral fin spine	--- ---	1.9 – 2.9	1.5 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.7
Length of second anal fin spine	5.9 –10.0	2.1 – 3.8	1.1 – 1.4
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	4.4 – 5.4	1.7 – 2.0	1.6 – 2.6
Longest dorsal fin spine	5.9 – 7.0	2.2 – 2.6	1.5 – 1.9
Longest dorsal fin ray	5.7 – 6.0	2.1 – 2.3	1.5 – 2.0
Least depth of caudal peduncle	7.5 –10.4	2.8 – 3.8	0.8 – 1.5
Ventral length of caudal peduncle	--- ---	1.8 – 2.1	2.0 – 2.3
Dorsal length of caudal peduncle	--- ---	2.6 – 3.0	1.3 – 1.6
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	14 (occas. 13 or 15)
Number of rays in anal fin	7 (occas. 8 or 6)
Number of rays in each pectoral fin	18 (occas. 17)
Unbranched rays in each pectoral fin	8 or 9 (occas. 7 or 10)
Number of rakers on first gill arch	35–42
Number of pores in lateral line	40–45
Diagonal rows of scales below lateral line	45–48

Number of specimens examined	10, plus 17
Size of specimens examined	5.0 – 19.2 inches

OTHER COMMON NAMES

Red snapper, rasher, borracho, borrachon, red rock cod, genuine red

FIGURE 21

COW ROCKFISH

Sebastodes levis (Eigenmann & Eigenmann 1889)

Range—Los Coronados Islands, Baja California to Monterey Bay, California.
Greatest depth taken and maximum size—150 fathoms; 36 inches.
Body color—Pink, including fins; several faint dusky splotches on back, these splotches darker in specimens less than about 16 inches length, which also have a number of small, dark red blotches on sides.
Mouth and gill cavities—White, with some light-pink; a dusky splotch may be present on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbit—Slightly convex to flat.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, moderately strong, rather prostrate. *Coronal and nuchal spines absent.*
Parietal ridges—Moderately strong, thin.
The five preopercular spines—Radially-directed, or the upper two to four may be rather backward; usually the second and third from the top are longest.
The two opercular spines—Strong, uppermost usually longer; both occasionally bifid.
Supracleithral and cleithral spines—Both present, moderately strong; the supracleithral may be double.
Lower margin of suborbital bone—Two small, triangular spines may be present in specimens less than about 18 inches length, but in larger specimens these become blunt.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A broad, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent, but tip of jaw usually elevated.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Without scales, or with a patch or two of fine scales.
Mandibles—Without scales, or with a patch or two of fine scales.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals usually extend beyond tips of ventrals, sometimes reaching anus.
Second anal fin spine—Only slightly thicker than the third, occasionally twice as thick. Tip of second reaches tip of third or slightly less (spines depressed).
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Lower corner rounded, but with a slight anterior slant to rest of profile.

Sebastodes levis (Eigenmann & Eigenmann 1889)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.8	1.1	4.2 – 5.1
Depth of body at origin of anal fin	3.5 – 3.9	1.4 – 1.6	3.0 – 3.8
Length of base of anal fin	6.6 – 8.0	2.7 – 3.4	1.5 – 1.8
Length of snout	7.6 – 8.7	3.2 – 3.6	1.4 – 1.7
Width of orbit	11.3 –13.1	4.6 – 5.5	--- ---
Width of interorbital space	--- ---	6.0 – 6.9	0.7 – 0.9
Width of suborbital bone	--- ---	--- ---	0.5 – 0.7
Length of upper jaw	4.7 – 4.9	1.9 – 2.0	2.4 – 2.8
Amount that lower jaw projects	--- ---	--- ---	0.3 – 0.4
Thickness of body	--- ---	--- ---	1.7 – 2.3
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.3
Longest pectoral fin ray	3.8 – 4.2	1.6 – 1.7	2.9 – 3.5
Longest ventral fin ray	--- ---	1.9 – 2.2	2.4 – 2.7
Length of ventral fin spine	--- ---	2.9 – 3.9	1.4 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.8
Length of second anal fin spine	7.1 –10.6	3.0 – 4.4	1.2 – 1.6
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	5.3 – 5.9	2.2 – 2.4	2.1 – 2.5
Longest dorsal fin spine	4.5 – 5.9	1.9 – 2.4	2.1 – 2.8
Longest dorsal fin ray	5.8 – 6.8	2.5 – 2.8	1.8 – 2.2
Least depth of caudal peduncle	9.5 –10.4	4.0 – 4.2	1.1 – 1.4
Ventral length of caudal peduncle	--- ---	2.0 – 2.4	2.1 – 2.6
Dorsal length of caudal peduncle	--- ---	2.8 – 3.2	1.6 – 1.9
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	13 (occas. 12)
Number of rays in anal fin	7 (occas. 6)
Number of rays in each pectoral fin	17 or 18
Unbranched rays in each pectoral fin	2–10
Number of rakers on first gill arch	29–32
Number of pores in lateral line	45–52
Diagonal rows of scales below lateral line	60–75

Number of specimens examined	7
Size of specimens examined	8.5 – 21.0 inches

OTHER COMMON NAMES

Roosterfish, gallo, chefra, cowfish

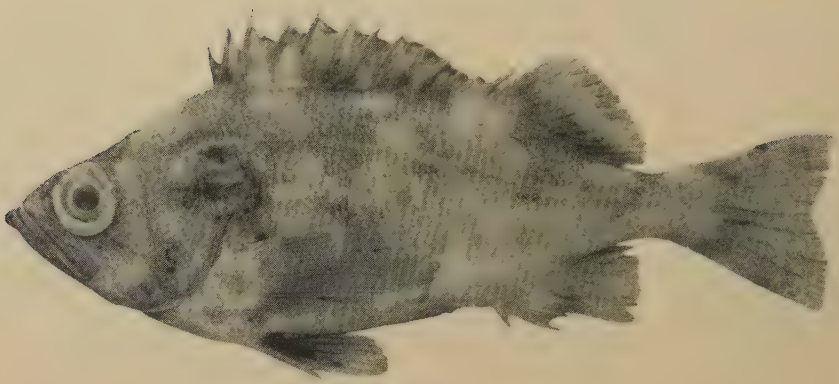

FIGURE 22

DARK-BLOTCHED ROCKFISH
Sebastodes crameri Jordan 1896

Range—Pt. Conception to Bering Sea.
Greatest depth taken and maximum size—200 fathoms; 20 inches.
Body color—Pink (young may be washed with light yellow-green), with four blackish patches on back (three under spinous and one under soft dorsal fin) and one smaller patch on caudal peduncle.
Mouth and gill cavities—In large specimens, the mouth and gill cavities may be blotched with considerable black, the clear portions, pink; in small specimens, there may be only a small amount of black blotching.
Peritoneum—Brownish with black dots, or black.
Top of head, at mid-orbits—Moderately convex in large specimens, but only slightly convex in smaller specimens.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal, and nuchals present, small and rather prostrate. In some cases, the nuchal spines may be coalesced with the parietals and appear to be absent. *Coronal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Radially directed, with the upper three largest.
The two opercular spines—Long and sharp.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Two triangular spines present, the rear one sometimes double.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A strong knob is present, directed rather downward.
Raised patch of teeth on tip of lower jaw—Present in larger specimens, but only a slight elevation in smaller fish; patch of teeth not completely included by the snout, with jaws closed.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus.
Second anal fin spine—Usually twice as thick as third. Tip of second not quite to tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or slightly convex (rounded).

Sebastodes crameri Jordan 1896

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.3 – 2.8	0.9 – 1.1	3.2 – 4.1
Depth of body at origin of anal fin	3.1 – 3.7	1.3 – 1.4	2.5 – 3.3
Length of base of anal fin	5.8 – 7.3	2.2 – 2.9	1.3 – 1.8
Length of snout	9.7 –10.8	3.7 – 4.1	0.8 – 1.1
Width of orbit	8.6 –10.6	3.3 – 4.0	--- ---
Width of interorbital space	--- ---	3.7 – 4.3	0.8 – 1.1
Width of suborbital bone	--- ---	--- ---	0.2
Length of upper jaw	5.4 – 5.9	2.1 – 2.7	1.6 – 1.9
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.5 – 1.9
Width of base of pectoral fin	--- ---	--- ---	0.9 – 1.1
Longest pectoral fin ray	3.3 – 3.8	1.3 – 1.5	2.4 – 3.0
Longest ventral fin ray	--- ---	1.8 – 2.0	1.8 – 2.2
Length of ventral fin spine	--- ---	2.8 – 3.3	1.2 – 1.3
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.7
Length of second anal fin spine	6.7 – 9.2	2.7 – 3.6	1.1 – 1.4
Length of third anal fin spine	--- ---	--- ---	1.0 – 1.3
Longest anal fin ray	5.2 – 6.1	2.1 – 2.4	1.6 – 1.8
Longest dorsal fin spine	7.0 – 8.1	2.7 – 3.4	1.2 – 1.4
Longest dorsal fin ray	6.0 – 7.4	2.4 – 2.9	1.2 – 1.6
Least depth of caudal peduncle	9.4 –11.4	3.6 – 4.4	0.8 – 1.1
Ventral length of caudal peduncle	--- ---	1.9 – 2.3	1.6 – 2.0
Dorsal length of caudal peduncle	--- ---	2.7 – 3.1	1.2 – 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.6

Number of rays in dorsal fin	13 or 14 (occas. 12)
Number of rays in anal fin	7
Number of rays in each pectoral fin	18–20
Unbranched rays in each pectoral fin	8-11
Number of rakers on first gill arch	29–33
Number of pores in lateral line	40–50
Diagonal rows of scales below lateral line	48–62

Number of specimens examined	20, plus 6
Size of specimens examined	6.5–18.0 inches

OTHER COMMON NAMES

Blackmouth rockfish

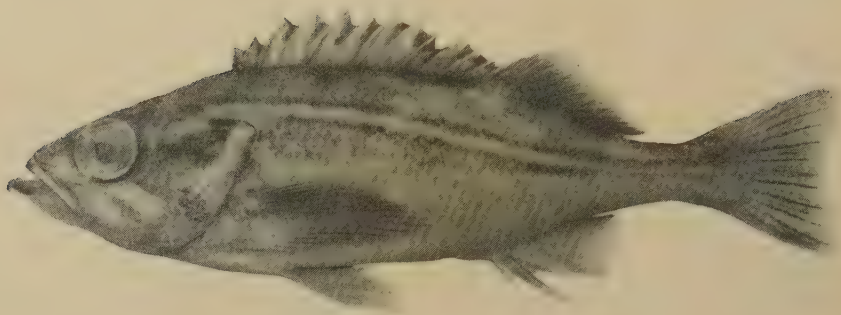

FIGURE 23

REDSTRIPE ROCKFISH

Sebastodes proriger (Jordan & Gilbert 1880)

Range—San Diego, California to Bering Sea.
Greatest depth taken and maximum size—100 fathoms; 20 inches.
Body color—Light-red mottled with olive dorsally and flushed with yellow on lower sides; lateral line in a clear, light-red zone; lips blackened. Fins red, the dorsal and caudal with some light green, the lower fins with some yellow.
Mouth and gill cavities—Mouth red with some dusky stippling; gill cavity white with some yellow on roof and patches of dusky; a dark blotch on underside of opercle.
Peritoneum—Brownish-black or black.
Top of head, at mid-orbits—Moderately convex.
Spines on top of head—Weak (the sharp edge of a knife may be needed to ascertain their presence.) Nasal, preocular, postocular, tympanic and parietals present. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Moderately strong and sharp, tending to be directed backward; second and third from the top usually the longest.
The two opercular spines—Moderately strong and sharp.
Supracleithral and cleithral spines—Both moderately strong.
Lower margin of suborbital bone—Two, rather triangular projections usually present.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A strong, forward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A slight elevation may be present. The teeth at tip tend to fit outside of snout.
End of maxillary—Under mid-orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, sometimes reaching anus.
Second anal fin spine—Twice as thick as third. Tip of second reaches about to tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Vertical, or with slight posterior slant.

Sebastodes proriger (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.9 – 3.1	--- ---	--- ---
Depth of body at origin of ventral fins	3.3 – 3.6	1.1 – 1.2	3.0 – 3.3
Depth of body at origin of anal fin	3.9 – 4.3	1.4	2.4 – 2.9
Length of base of anal fin	6.9 – 8.0	2.3 – 2.8	1.3 – 1.7
Length of snout	11.0 –12.0	3.8 – 4.1	0.9 – 1.0
Width of orbit	10.8 –11.9	3.4 – 4.0	--- ---
Width of interorbital space	--- ---	4.1 – 4.3	0.8 – 1.0
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	6.8 – 7.2	2.3 – 2.4	1.5 – 1.7
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.5 – 1.8
Width of base of pectoral fin	--- ---	--- ---	0.9 – 1.0
Longest pectoral fin ray	3.6 – 3.7	1.2 – 1.3	2.9 – 3.4
Longest ventral fin ray	--- ---	1.8 – 1.9	1.8 – 2.2
Length of ventral fin spine	--- ---	2.4 – 2.8	1.4 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	6.5 – 8.6	2.1 – 2.9	1.4 – 1.6
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.3
Longest anal fin ray	6.2 – 6.9	2.0 – 2.3	1.6 – 1.7
Longest dorsal fin spine	8.3 – 8.8	2.7 – 3.0	1.2 – 1.4
Longest dorsal fin ray	8.0 – 8.6	2.7 – 2.9	1.3 – 1.4
Least depth of caudal peduncle	11.3 –12.1	3.7 – 4.2	0.9 – 1.0
Ventral length of caudal peduncle	--- ---	1.4 – 1.6	2.3 – 2.6
Dorsal length of caudal peduncle	--- ---	2.3 – 2.4	1.5 – 1.7
Posterior of anus to origin of anal fin	--- ---	--- ---	0.6 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.5

Number of rays in dorsal fin	14 or 15 (occas. 13)
Number of rays in anal fin	7 (occas. 6)
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	38–43
Number of pores in lateral line	47–50
Diagonal rows of scales below lateral line	55–60

Number of specimens examined	6, plus 1
Size of specimens examined	9.0–15.2 inches

FIGURE 24

KELP ROCKFISH

Sebastodes atrovirens (Jordan & Gilbert 1880)

Range—San Carlos Bay, Baja California to San Francisco, California.
Greatest depth taken and maximum size—25 fathoms; 15 inches.
Body color—Dark olive-gray to olive brown, mottled with darker color; fins same color as body.
Mouth and gill cavities—Whitefish, with dusky splotches and occasionally some yellow; a black splotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Strongly convex, with a flattening near orbits.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, thick, rather prostrate, covered with skin. Nasals prominent; tympanics small and sometimes absent. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Low and rounded.
The five preopercular spines—Moderately strong, radially directed; often, the second and third from top longest.
The two opercular spines—Moderately strong and usually sharp, occasionally blunt.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Two strong, sharply triangular spines present, both directed downward and backward.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A small, sometimes slight, downward projecting knob present.
Raised patch of teeth on tip of lower jaw—Absent, but slight elevation may be present.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals, or only slightly beyond. Tips of pectorals reaching anus or beyond, sometimes nearly to anal fin; tips of ventrals often reach front of anus.
Second anal fin spine—Usually twice as thick as third. Tip of the second usually not quite to tip of third, but occasionally so.
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes atrovirens (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.8	1.0	3.3 – 4.3
Depth of body at origin of anal fin	3.2 – 3.5	1.2 – 1.3	2.8 – 3.6
Length of base of anal fin	5.5 – 6.2	2.1 – 2.3	1.6 – 1.9
Length of snout	10.6 –12.1	4.0 – 4.4	0.9 – 1.0
Width of orbit	9.2 –11.4	3.5 – 4.2	--- ---
Width of interorbital space	--- ---	4.8 – 5.5	0.7 – 0.9
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	5.1 – 5.9	2.0 – 2.2	1.7 – 2.0
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.2
Thickness of body	--- ---	--- ---	1.9 – 2.3
Width of base of pectoral fin	--- ---	--- ---	0.9 – 1.2
Longest pectoral fin ray	3.0 – 3.4	1.1 – 1.3	2.9 – 3.7
Longest ventral fin ray	--- ---	1.5 – 1.7	2.0 – 2.7
Length of ventral fin spine	--- ---	2.1 – 2.6	1.4 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	5.0 – 6.9	1.9 – 2.6	1.6 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.6 – 1.7
Longest anal fin ray	4.4 – 4.9	1.6 – 1.8	2.0 – 2.6
Longest dorsal fin spine	5.2 – 6.3	2.0 – 2.5	1.6 – 2.0
Longest dorsal fin ray	5.0 – 5.6	1.9 – 2.1	1.7 – 2.2
Least depth of caudal peduncle	7.8 – 8.6	2.9 – 3.2	1.1 – 1.4
Ventral length of caudal peduncle	--- ---	1.9 – 2.2	1.7 – 2.2
Dorsal length of caudal peduncle	--- ---	3.0 – 3.5	1.1 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.4

Number of rays in dorsal fin	14 (occas. 13)
Number of rays in anal fin	7
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	31–33
Number of pores in lateral line	37–44
Diagonal rows of scales below lateral line	40–48

Number of specimens examined	8, plus 5
Size of specimens examined	4.2–11.5 inches

OTHER COMMON NAMES

Gopher rockfish, garrupa

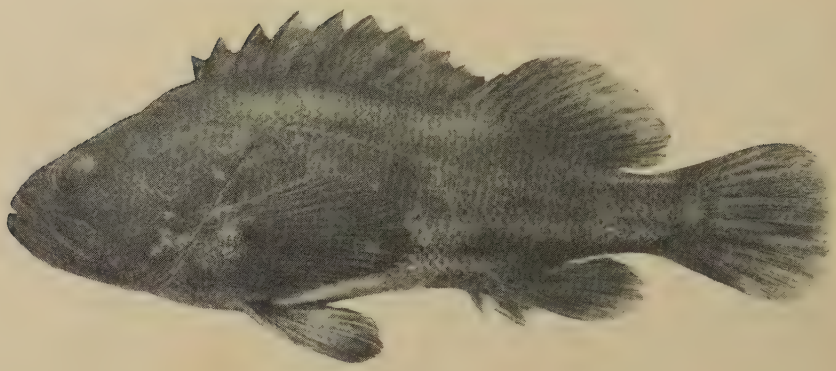

FIGURE 25

GRASS ROCKFISH

Sebastodes rastrelliger (Jordan & Gilbert 1880)

Range—Playa Maria Bay, Baja California to Eureka, California.
Greatest depth taken and maximum size—25 fathoms; 16 inches.
Body color—Dark oliveaceous green; fins dark.
Mouth and gill cavities—White, tinged with green; a black blotch on underside of opercle.
Peritoneum—Silvery white, with some dusky areas.
Top of head, at mid-orbits—Strongly convex, with a flattening near orbits.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present strong, covered with skin, rather prostrate. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Low and broad.
The five preopercular spines—Short and rather blunt; occasionally a spine is bifid. Usually directed backward, with the upper two the longest.
The two opercular spines—Blunt, the lowermost usually composed of two or more points, the uppermost occasionally bifid.
Supracleithral and cleithral spines—Both strong.
Lower margin of suborbital bone—Spines absent, but two small projections usually present.
Lower posterior edge of gill cover—One or more spines usually present.
Symphyseal knob—Absent.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil, rear of orbit, or slightly beyond.
Maxillaries—Partially with imbedded scales (the skin is slack and thick).
Mandibles—Scales usually absent, but in an occasional specimen there is a small patch of scales on base of mandible (the skin is slack).
Branchiostegals—Usually without scales, but occasionally a small patch may be present.
Ends of pectoral and ventral fins—Tips of pectorals reach tips of ventrals or slightly beyond. Tips of pectorals may fall slightly short of anus, or they may extend slightly beyond.
Second anal fin spine—May be only a little thicker than third, or about twice as thick. Tip of second does not quite reach tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes rastrelliger (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 2.9	1.0 – 1.2	4.3 – 5.1
Depth of body at origin of anal fin	3.6 – 3.7	1.4 – 1.6	3.4 – 3.9
Length of base of anal fin	5.7 – 6.8	2.2 – 2.8	1.9 – 2.3
Length of snout	9.5 –10.9	3.8 – 4.2	1.2 – 1.5
Width of orbit	12.6 –14.5	4.9 – 5.7	--- ---
Width of interorbital space	--- ---	5.9 – 7.5	0.7 – 0.9
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	4.9 – 5.9	2.0	2.5 – 2.8
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	2.5 – 3.2
Width of base of pectoral fin	--- ---	--- ---	1.5 – 1.7
Longest pectoral fin ray	3.3 – 3.7	1.3 – 1.5	3.6 – 3.9
Longest ventral fin ray	--- ---	1.8 – 2.1	2.7 – 2.9
Length of ventral fin spine	--- ---	3.0 – 3.5	1.4 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.8 – 0.9
Length of second anal fin spine	7.4 – 9.4	2.9 – 3.7	1.3 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.3 – 1.6
Longest anal fin ray	4.8 – 5.8	1.9 – 2.4	2.2 – 2.7
Longest dorsal fin spine	6.3 – 7.5	2.5 – 3.0	1.8 – 2.1
Longest dorsal fin ray	5.4 – 5.8	2.0 – 2.4	2.2 – 2.5
Least depth of caudal peduncle	8.3 – 9.0	3.2 – 3.5	1.5 – 1.7
Ventral length of caudal peduncle	--- ---	2.0 – 2.2	2.4 – 2.9
Dorsal length of caudal peduncle	--- ---	3.0 – 3.7	1.3 – 1.9
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.2

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6
Number of rays in each pectoral fin	19 (occas. 18 or 20)
Unbranched rays in each pectoral fin	10 (occas. 9 or 11)
Number of rakers on first gill arch	22–25
Number of pores in lateral line	42–47
Diagonal rows of scales below lateral line	45–49

Number of specimens examined	6, plus 12
Size of specimens examined	9.0–15.5 inches

OTHER COMMON NAMES

Kelp rockfish, scomoda

FIGURE 26

BROWN ROCKFISH

Sebastodes auriculatus (Girard 1854)

Range—San Carlos Bay, Baja California to S. E. Alaska.
Greatest depth taken and maximum size—30 fathoms; 18 inches.
Body color—Light brown mottled with dark brown; a dark blotch on upper portion of opercle; fins dusky-pink.
Mouth and gill cavities—Mainly white; a dark blotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Slightly convex to flat.
Spines on top of head—Nasal, preocular, postocular, tympanic, parietal and coronals present, moderately strong, rather prostrate; nuchals present or absent. *Supraocular spines absent.*
Parietal ridges—Moderately strong and thin, sometimes irregular on top.
The five preopercular spines—Strong; an occasional spine bifid. Usually radially-directed, but occasionally the upper two to four are directed backward.
The two opercular spines—Strong, sharp.
Supracleithral and cleithral spines—Both strong; supracleithral occasionally is double.
Lower margin of suborbital bone—Usually with a small lobe, followed by a larger, somewhat triangular spine.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A slight knob may be present or absent.
Raised patch of teeth on tip of lower jaw—Absent (a slight elevation may be present).
End of maxillary—Under rear of pupil, or rear of orbit.
Maxillaries—Sometimes covered with scales, sometimes with only a patch of scales.
Mandibles—Without scales.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of the pectorals may extend only to tips of ventrals, or slightly beyond, but do not reach anus.
Second anal fin spine—About twice as thick as third. Tip of second may reach tip of third.
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes auriculatus (Girard 1854)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 2.8	1.0 – 1.1	4.3 – 4.9
Depth of body at origin of anal fin	3.2 – 3.9	1.2 – 1.5	3.2 – 3.8
Length of base of anal fin	5.6 – 6.8	2.1 – 2.6	1.7 – 2.2
Length of snout	8.4 –10.7	3.2 – 4.2	1.1 – 1.6
Width of orbit	11.4 –13.7	4.5 – 5.1	-- ---
Width of interorbital space	--- ---	4.9 – 5.8	0.8 – 1.0
Width of suborbital bone	--- ---	--- ---	0.3 – 0.5
Length of upper jaw	4.9 – 5.4	1.9 – 2.1	2.3 – 2.7
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	2.3 – 2.9
Width of base of pectoral fin	--- ---	--- ---	1.2 – 1.4
Longest pectoral fin ray	3.6 – 3.8	1.2 – 1.5	3.2 – 3.7
Longest ventral fin ray	--- ---	1.7 – 2.0	2.6 – 2.9
Length of ventral fin spine	--- ---	2.5 – 3.3	1.5 – 1.9
Length of first anal fin spine	- - ---	- ---	0.7 – 1.0
Length of second anal fin spine	5.9 – 8.5	2.1 – 3.3	1.5 – 2.1
Length of third anal fin spine	--- ---	--- ---	1.4 – 1.8
Longest anal fin ray	4.8 – 5.6	1.9 – 2.0	2.1 – 2.9
Longest dorsal fin spine	5.1 – 5.6	2.0 – 2.1	2.2 – 2.4
Longest dorsal fin ray	5.6 – 6.1	2.1 – 2.4	1.9 – 2.3
Least depth of caudal peduncle	8.5 – 9.4	3.2 – 3.6	1.3 – 1.6
Ventral length of caudal peduncle	--- ---	2.1 – 2.3	2.1 – 2.4
Dorsal length of caudal peduncle	-- ---	3.3 – 3.7	1.3 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.5

Number of rays in dorsal fin	13 (occas. 12, 14 or 15)
Number of rays in anal fin	7 (occas. 6 or 8)
Number of rays in each pectoral fin	18 (occas. 15–17)
Unbranched rays in each pectoral fin	8–11
Number of rakers on first gill arch	25–30
Number of pores in lateral line	42–49
Diagonal rows of scales below lateral line	45–52

Number of specimens examined	6, plus 11
Size of specimens examined	7.0–17.0 inches

OTHER COMMON NAMES

Bolina

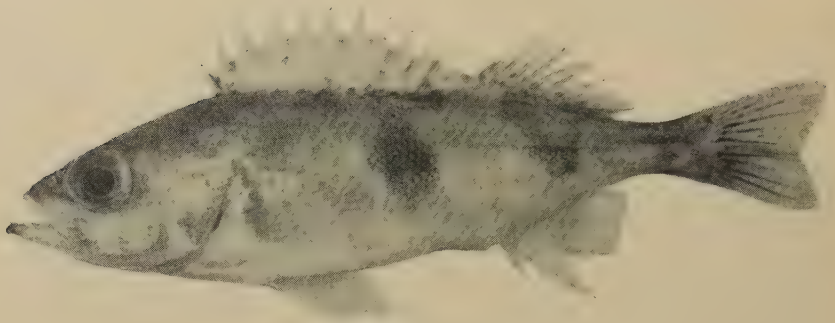

FIGURE 27

HALFBANDED ROCKFISH

Sebastodes semicinctus Gilbert 1896

Range—Sebastian Viscaino Bay, Baja California to Santa Barbara, California.
Greatest depth taken and maximum size—120 fathoms; 10 inches.
Body color—Dusky-pink above and silvery-pink on sides; two conspicuous dark-red bars on posterior half of body; brown spots on back; brown streaks on membranes of caudal fin; fins on lower side of body light-pink, the dorsal splotched with light yellow-green.
Mouth and gill cavities—White, tinged with pink and yellow; a dark green blotch on underside of opercle.
Peritoneum—Gray, with numerous black dots, or black.
Top of head, at mid-orbits—Flat.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, sharp but not strong, rather prostrate. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately strong, thin.
The five preopercular spines—Moderately strong, sharp, radially-directed or with the upper two or three directed backward.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Both small, close together.
Lower margin of suborbital bone—Two strong, sharply triangular spines present, directed downward and backward.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A small, pointed, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent (a slight elevation is present).
End of Maxillary—Under front of pupil, or barely to mid-orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—Some small scales present.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, and reach anus or slightly beyond.
Second anal fin spine—About twice as thick as third. Tip of second extends a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or with a slight posterior slant.

Sebastodes semicinctus Gilbert 1896

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.8 – 2.9	--- ---	--- ---
Depth of body at origin of ventral fins	3.4 – 3.7	1.2 – 1.3	2.5 – 2.8
Depth of body at origin of anal fin	4.2 – 4.7	1.4 – 1.6	2.0 – 2.3
Length of base of anal fin	6.3 – 7.3	2.2 – 2.5	1.3 – 1.5
Length of snout	11.4 –12.5	3.9 – 4.4	0.8
Width of orbit	9.3 –10.0	3.2 – 3.4	--- ---
Width of interorbital space	--- ---	4.7 – 5.3	0.6 – 0.7
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	6.8 – 7.1	2.3 – 2.5	1.3 – 1.4
Amount that lower jaw projects	--- ---	--- ---	0.2
Thickness of body	--- ---	--- ---	1.4 – 1.6
Width of base of pectoral fin	--- ---	--- ---	0.8 – 0.9
Longest pectoral fin ray	3.3 – 3.4	1.1 – 1.2	2.7 – 3.0
Longest ventral fin ray	--- ---	1.7 – 1.9	1.7 – 1.9
Length of ventral fin spine	--- ---	2.3 – 2.5	1.3 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	5.0 – 6.1	1.7 – 2.1	1.6 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	6.0 – 7.3	2.1 – 2.6	1.3 – 1.6
Longest dorsal fin spine	6.7 – 7.3	2.3 – 2.6	1.3 – 1.5
Longest dorsal fin ray	7.2 – 7.9	2.5 – 2.7	1.2 – 1.4
Least depth of caudal peduncle	11.7 –13.7	4.0 – 4.4	0.8
Ventral length of caudal peduncle	--- ---	1.7 – 1.9	1.7 – 2.0
Dorsal length of caudal peduncle	--- ---	2.5 – 2.7	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.6 – 0.8
Longest raker on first gill arch	--- ---	--- ---	0.5 – 0.6

Number of rays in dorsal fin	13
Number of rays in anal fin	7 (occas. 8)
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	7 or 8 (occas. 9)
Number of rakers on first gill arch	37–40
Number of pores in lateral line	42–47
Diagonal rows of scales below lateral line	46–51

Number of specimens examined	6, plus 7
Size of specimens examined	5.6 – 7.0 inches

OTHER COMMON NAMES

Inspector

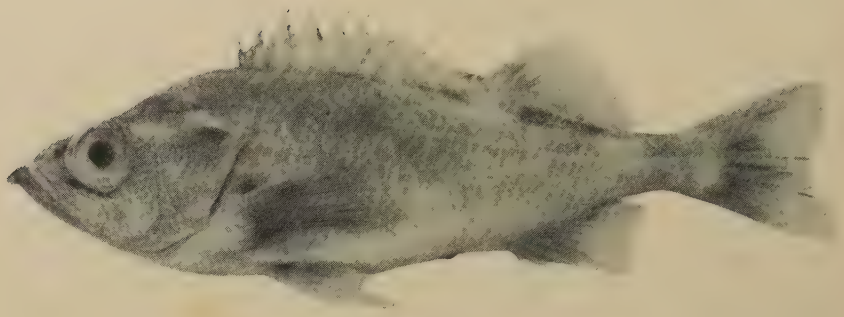

FIGURE 28

PACIFIC OCEAN PERCH
Sebastodes alutus (Gilbert 1890)

Range—La Jolla, California to Bering Sea.
Greatest depth taken and maximum size—300 fathoms; 20 inches.
Body color—Light red including fins; a dark oliveaceous area on back under soft dorsal, and a smaller dark area on caudal peduncle; some light olive stippling on sides.
Mouth and gill cavities—Mouth mainly pink, but with some duskiness; gill cavity pink, with considerable black blotching in adults.
Peritoneum—Gray with black dots or black.
Top of head, at mid-orbits—Slightly convex to flat.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals usually present, but small and weak (a tympanic or supraocular spine may be absent occasionally). *Coronal and nuchal spines absent.*
Parietal ridges—Low and thin.
The five preopercular spines—Moderately strong, sharp, usually radially-directed but sometimes with upper two directed backward.
The two opercular spines—Moderately strong, thin and sharp, the uppermost usually longer.
Supracleithral and cleithral spines—Strong to weak.
Lower margin of suborbital bone—Two small, sharply triangular spines, or rounded lobes present.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A prominent, pointed, forward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A strongly raised patch of teeth present; not completely included by snout when jaws are closed.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals, or slightly beyond, sometimes reaching anus.
Second anal fin spine—Usually twice as thick as third, occasionally only slightly thicker. Tip of second fails to reach tip of third by about one-sixth of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or with slight posterior slant.

Sebastodes alutus (Gilbert 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.8 – 3.4	1.1 – 1.2	2.8 – 3.5
Depth of body at origin of anal fin	3.7 – 4.6	1.4 – 1.6	2.1 – 2.7
Length of base of anal fin	6.1 – 7.1	2.4 – 2.6	1.4 – 1.6
Length of snout	10.0 –11.3	3.8 – 4.2	0.8 – 1.0
Width of orbit	9.3 –10.1	3.4 – 3.8	--- ---
Width of interorbital space	--- ---	4.6 – 4.9	0.7 – 0.8
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	5.6 – 6.2	2.1 – 2.3	1.6 – 1.8
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.4
Thickness of body	--- ---	--- ---	1.4 – 1.7
Width of base of pectoral fin	--- ---	--- ---	0.8 – 0.9
Longest pectoral fin ray	3.6 – 4.1	1.3 – 1.5	2.4 – 2.8
Longest ventral fin ray	--- ---	1.8 – 2.0	1.8 – 2.1
Length of ventral fin spine	--- ---	2.9 – 3.4	1.0 – 1.2
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	8.3 –10.8	3.5 – 4.2	0.9 – 1.0
Length of third anal fin spine	--- ---	--- ---	0.9 – 1.1
Longest anal fin ray	5.9 – 6.6	2.3 – 2.4	1.5 – 1.6
Longest dorsal fin spine	7.9 – 8.9	2.9 – 3.4	1.1 – 1.2
Longest dorsal fin ray	6.7 – 7.8	2.5 – 2.9	1.2 – 1.5
Least depth of caudal peduncle	10.6 –12.3	4.1 – 4.5	0.8 – 1.1
Ventral length of caudal peduncle	--- ---	1.8 – 2.0	1.8 – 1.9
Dorsal length of caudal peduncle	--- ---	2.5 – 2.8	1.3 – 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.6

Number of rays in dorsal fin	14 or 15 (rarely 16 or 17)
Number of rays in anal fin	8 or 9
Number of rays in each pectoral fin	18 (occas. 17)
Unbranched rays in each pectoral fin	8 (occas. 6, 7 or 9)
Number of rakers on first gill arch	33–38
Number of pores in lateral line	44–51
Diagonal rows of scales below lateral line	49–55

Number of specimens examined	11, plus 4
Size of specimens examined	13.0 – 17.8 inches

OTHER COMMON NAMES

Longjaw rockfish

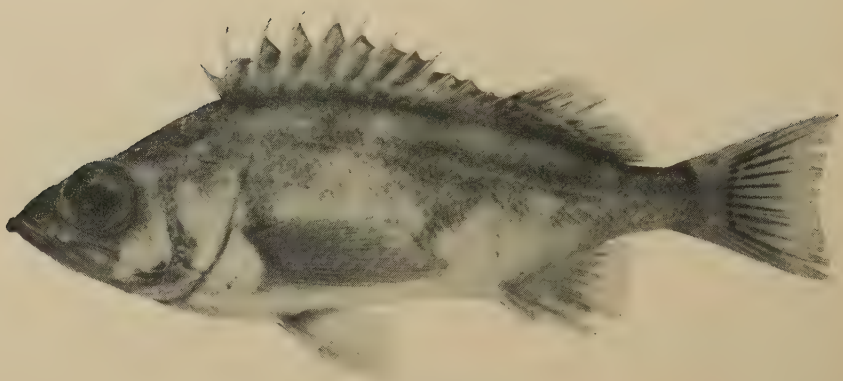

FIGURE 29

STRIPETAIL ROCKFISH
Sebastodes saxicola (Gilbert 1890)

Range—Sebastian Viscaino Bay, Baja California to S. E. Alaska.
Greatest depth taken and maximum size—130 fathoms; 13 inches.
Body color—Yellow-pink with some light green; several vague, dusky blotches on back, these darker in young; green streaks on membranes of caudal fin, at least on upper portion; fins pink, with some yellow.
Mouth and gill cavities—White, often with some pink or yellow.
Peritoneum—Black.
Top of head, at mid-orbits—Nearly flat or slightly concave. Usually with a narrow median groove between a pair of low, frontal ridges.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, moderately strong and sharp. *Supraocular, coronal and nuchal spines absent*, but occasionally a nuchal spine is present.
Parietal ridges—Moderately high, rounded.
The five preopercular spines—Thin and sharp, usually radially-directed, but sometimes with upper two directed backward; second from the top usually strongest.
The two opercular spines—Thin and sharp.
Supracleithral and cleithral spines—Both moderately strong; cleithral sometimes double.
Lower margin of suborbital bone—Two, strong, sharply triangular spines present, directed rather backward; occasionally, one or the other may be double.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A strong pointed, forward and downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present in large specimens, but only as a slight elevation in small fish; not completely included by snout, with jaws closed.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus, or nearly so. In young, tips of the pectorals may extend beyond anus, with tips of ventrals reaching anus.
Second anal fin spine—Twice as thick as third. Tip of second projects a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Nearly vertical, or with slight posterior slant.

Sebastodes saxicola (Gilbert 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.9 – 3.2	1.1 – 1.2	2.4 – 2.9
Depth of body at origin of anal fin	3.7 – 4.1	1.4 – 1.6	1.8 – 2.3
Length of base of anal fin	5.9 – 7.7	2.3 – 3.0	1.1 – 1.5
Length of snout	10.4 –11.7	3.9 – 4.4	0.7 – 0.9
Width of orbit	7.4 – 8.5	2.9 – 3.2	--- ---
Width of interorbital space	--- ---	4.7 – 5.3	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.1 – 0.2
Length of upper jaw	5.8 – 6.2	2.2 – 2.4	1.3 – 1.5
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.3
Thickness of body	--- ---	--- ---	1.1 – 1.5
Width of base of pectoral fin	--- ---	--- ---	0.6 – 0.8
Longest pectoral fin ray	3.3 – 3.7	1.3 – 1.4	2.2 – 2.5
Longest ventral fin ray	--- ---	1.8 – 1.9	1.6 – 1.8
Length of ventral fin spine	--- ---	2.5 – 2.8	1.1 – 1.2
Length of first anal fin spine	--- ---	--- ---	0.6 – 0.9
Length of second anal fin spine	4.5 – 6.6	1.7 – 2.5	1.3 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.0 – 1.3
Longest anal fin ray	5.5 – 6.5	2.0 – 2.4	1.3 – 1.6
Longest dorsal fin spine	6.2 – 7.2	2.3 – 2.7	1.1 – 1.3
Longest dorsal fin ray	5.9 – 7.4	2.3 – 2.8	1.1 – 1.4
Least depth of caudal peduncle	10.1 –12.1	3.9 – 4.6	0.7 – 0.8
Ventral length of caudal peduncle	--- ---	2.0	1.4 – 1.6
Dorsal length of caudal peduncle	--- ---	2.4 – 2.7	1.1 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.4
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.4

Number or rays in dorsal fin	12 (occas. 13)
Number of rays in anal fin	7 (occas. 5, 6 or 8)
Number of rays in each pectoral fin	16 (occas. 15 or 17)
Unbranched rays in each pectoral fin	6 or 7
Number of rakers on first gill arch	31–34
Number of pores in lateral line	36–42
Diagonal rows of scales below lateral line	43–53

Number of specimens examined	9, plus 26
Size of specimens examined	4.0 – 12.0 inches

OTHER COMMON NAMES

Popeye rockfish, bigeye rockfish, oliveback rockfish

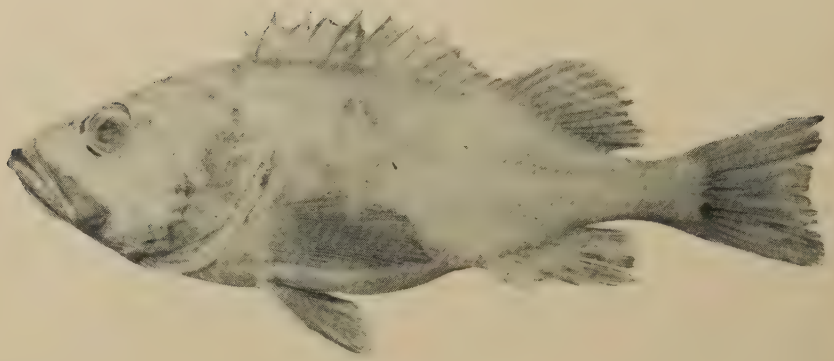

FIGURE 30

ROUGHEYE ROCKFISH

Sebastodes aleutianus Jordan & Evermann 1898

Range—Monterey, California to Aleutian Islands, Alaska.
Greatest depth taken and maximum size—250 fathoms; 30 inches.
Body color—Red on back, becoming pink on sides; fins reddish, usually with some black on terminal portions. Vague spots and traces of dusky bars may be present.
Mouth and gill cavities—White or pink, with black splotches in large specimens.
Peritoneum—White, with many black dots resulting in a light-gray appearance.
Top of head at mid-orbits—Slightly convex to flat, with a pair of low frontal ridges between the ocular ridges. Frontal ridges may be as high or higher than ocular ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal, coronal and nuchal spines present, strong, rather prostrate. Occasionally, coronal spines may be absent and sometimes two nuchal spines follow each parietal spine.
Parietal ridges—Strong, often irregular on top, or broken into points.
The five preopercular spines—Strong, the lowermost sometimes multifid. Occasionally the upper two to upper four are directed backward.
The two opercular spines—Strong and sharp, the upper sometimes longer.
Supracleithral and cleithral spines—Both strong, occasionally bifid.
Lower margin of suborbital bone—Strong spines present, occasionally multifid.
Lower posterior edge of gill cover—Spines usually present.
Symphyseal knob—A low, broad, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present in large specimens. This patch not included by snout when jaws closed.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus in small specimens but short of anus in large.
Second anal fin spine—Twice as thick as third. Tip of second may reach tip of third in small specimens, but falls short in large fish (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Convex (rounded).

Sebastodes aleutianus Jordan & Evermann 1898

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.0	1.0 – 1.2	3.1 – 3.8
Depth of body at origin of anal fin	3.5 – 4.3	1.4 – 1.7	2.3 – 2.8
Length of base of anal fin	6.2 – 7.6	2.4 – 3.0	1.3 1.7
Length of snout	8.8 –10.5	3.6 – 4.1	0.8 – 1.2
Width of orbit	8.8 –10.9	3.3 – 4.4	--- ---
Width of interorbital space	--- ---	4.6 – 5.5	0.6 – 0.9
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	4.9 – 5.5	1.9 – 2.1	1.7 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.2 – 0.3
Thickness of body	--- ---	--- ---	1.5 – 1.7
Width of base of pectoral fin	--- ---	--- ---	0.9 – 1.0
Longest pectoral fin ray	3.6 – 4.0	1.4 – 1.6	2.4 – 2.8
Longest ventral fin ray	--- ---	1.9 – 2.1	1.8 – 2.2
Length of ventral fin spine	--- ---	3.0 – 3.8	1.2 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	7.2 –12.6	2.7 – 5.0	0.8 – 1.3
Length of third anal fin spine	--- ---	--- ---	1.0 – 1.3
Longest anal fin ray	5.3 – 6.0	2.0 – 2.4	1.5 – 2.2
Longest dorsal fin spine	7.1 – 8.9	2.8 – 3.6	1.1 – 1.4
Longest dorsal fin ray	5.8 – 6.9	2.2 – 2.7	1.5 – 1.8
Least depth of caudal peduncle	10.0 –11.8	3.8 – 4.7	0.8 – 1.0
Ventral length of caudal peduncle	--- ---	2.0 – 2.3	1.9 – 2.1
Dorsal length of caudal peduncle	--- ---	2.8 – 3.1	1.3 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.6

Number of rays in dorsal fin	13 or 14 (occas. 15)
Number of rays in anal fin	7 or 8 (occas. 6)
Number of rays in each pectoral fin	18 or 19
Unbranched rays in each pectoral fin	1–9
Number or rakers on first gill arch	30–34
Number of pores in lateral line	29–34
Diagonal rows of scales below lateral line	47–55

Number of specimens examined	8, plus 5
Size of specimens examined	6.0 – 22.2 inches

OTHER COMMON NAMES

Black-throated rockfish, blacktip rockfish

FIGURE 31

BLACKGILL ROCKFISH

Sebastodes melanostomus Eigenmann & Eigenmann 1890

Range—Cedros Island, Baja California to Bering Sea.
Greatest depth taken and maximum size—300 fathoms; 24 inches.
Body color—Uniformly dark red, including fins; vague, dusky bars may be present on back, these prominent in young specimens; most fins with blackened tips.
Mouth and gill cavities—Largely black, the remaining area pink; posterior margin of branchiostegal membrane black.
Peritoneum—Dark brown with black dots, or black.
Top of head, at mid-orbits—Flat or shallowly concave; sometimes with faint frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchals present, moderately strong. Sometimes a nuchal spine may be coalesced with a parietal. *Coronal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Moderately strong and sharp, usually radially-directed; occasionally, the upper two are directed backward.
The two opercular spines—Strong and sharp, the upper sometimes longer.
Supracleithral and cleithral spines—Both strong, the cleithral sometimes double.
Lower margin of suborbital bone—Two sharply triangular spines present, the rearmost sometimes double.
Lower posterior edge of gill cover—spines absent.
Symphyseal knob—A large, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present in large specimens. This patch not included by snout with jaws closed.
End of maxillary—Under rear of orbit in large specimens; under mid-orbit in very small.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals and reach anus, or nearly so.
Second anal fin spine—Twice as thick as third. Tip of second may or may not reach tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Nearly vertical, or slightly convex (rounded).

Sebastodes melanostomus Eigenmann & Eigenmann 1890

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.2 - 2.4	---	---
Depth of body at origin of ventral fins	2.8 – 3.0	1.2	2.8 – 3.5
Depth of body at origin of anal fin	3.8 – 4.3	1.6 – 1.8	2.0 – 2.6
Length of base of anal fin	6.1 – 7.4	2.6 – 3.1	1.1 – 1.3
Length of snout	9.5 –11.0	4.0 – 4.6	0.6 – 1.0
Width of orbit	7.0 – 9.7	2.9 – 4.2	--- ---
Width of interorbital space	--- ---	5.0 – 6.6	0.5 – 0.8
Width of suborbital bone	--- ---	--- ---	0.1 – 0.3
Length of upper jaw	4.9 – 5.5	2.1 – 2.3	1.3 – 2.0
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.2
Thickness of body	--- ---	--- ---	1.3 – 1.7
Width of base of pectoral fin	--- ---	--- ---	0.7 – 0.9
Longest pectoral fin ray	3.9 – 4.0	1.6 – 1.7	2.2 – 2.5
Longest ventral fin ray	--- ---	2.2 – 2.4	1.6 – 1.8
Length of ventral fin spine	--- ---	2.8 – 3.7	1.0 – 1.2
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.6
Length of second anal fin spine	5.9 –10.0	2.5 – 4.2	0.9 – 1.3
Length of third anal fin spine	--- ---	--- ---	0.9 – 1.0
Longest anal fin ray	5.8 – 6.4	2.4 – 2.7	1.4 – 1.6
Longest dorsal fin spine	6.6 – 9.5	2.6 – 4.0	0.9 – 1.2
Longest dorsal fin ray	6.8 – 7.2	3.0	1.2 – 1.3
Least depth of caudal peduncle	10.4 –11.6	4.3 – 4.9	0.6 – 0.9
Ventral length of caudal peduncle	--- ---	2.1 – 2.4	1.2 – 2.0
Dorsal length of caudal peduncle	--- ---	2.7 – 3.2	1.0 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.5

Number of rays in dorsal fin	13 (occas. 14 or 15)
Number of rays in anal fin	7 (occas. 6 or 8)
Number of rays in each pectoral fin	18–20
Unbranched rays in each pectoral fin	5–9
Number of rakers on first gill arch	29–35
Number of pores in lateral line	29–31
Diagonal rows of scales below lateral line	45–50

Number of specimens examined	9, plus 9
Size of specimens examined	6.0 – 20.2 inches

OTHER COMMON NAMES

Blackmouth rockfish, deepsea rockfish

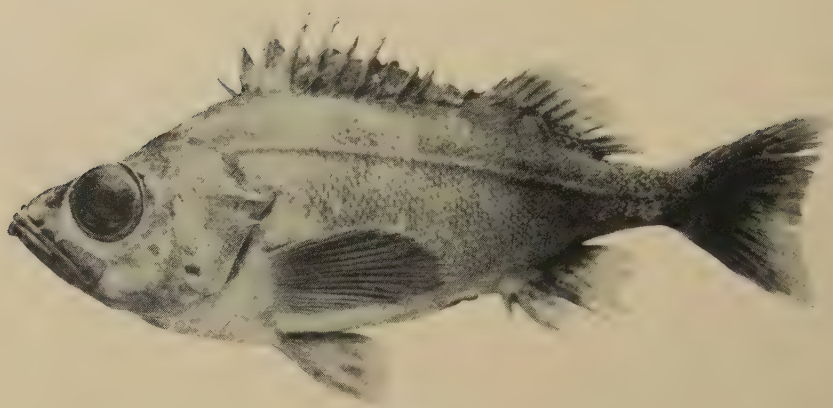

FIGURE 32

SPLITNOSE ROCKFISH
Sebastodes diploproa (Gilbert 1890)

Range—Los Coronados Islands, Baja California to Vancouver, British Columbia.
Greatest depth taken and maximum size—250 fathoms; 18 inches.
Body color—Uniformly rose-red.
Mouth and gill cavities—Pink and white.
Peritoneum—Black.
Top of head, at mid-orbits—Flat to slightly concave. Usually there is a narrow median groove, with a low frontal ridge on either side; the tops of the frontal ridges may be as high as the tops of the ocular ridges.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong and sharp. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Strong and sharp, with often the upper two or three the strongest. Usually, radially-directed, but occasionally the upper two are directed backward.
The two opercular spines—Long, thin and sharp, the uppermost usually longest.
Supracleithral and cleithral spines—Supracleithral usually weak, the cleithral moderately strong.
Lower margin of suborbital bone—Two strong spines present; the anterior one is directed somewhat forward and the posterior somewhat backward.
Lower posterior edge of gill cover—Spines usually present.
Symphyseal knob—A small, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present in large specimens, but only a slight elevation in small specimens.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Scales present, but sometimes only a patch.
Mandibles—Scales present, but sometimes only a patch.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals reaching anus, or beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second reaches about to tip of third.
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Nearly vertical, or slightly convex (rounded).

Sebastodes diploproa (Gilbert 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.8	1.0 – 1.2	2.6 – 3.2
Depth of body at origin of anal fin	3.5 – 3.9	1.4 – 1.6	2.0 – 2.4
Length of base of anal fin	6.4 – 7.3	2.5 – 2.9	1.0 – 1.3
Length of snout	9.8 –12.3	4.0 – 4.7	0.6 – 0.8
Width of orbit	7.3 – 8.7	3.0 – 3.5	--- ---
Width of interorbital space	--- ---	5.0 – 6.1	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	5.5 – 6.1	2.2 – 2.4	1.3 – 1.6
Amount that lower jaw projects	--- ---	--- ---	0.1
Thickness of body	--- ---	--- ---	1.2 – 1.4
Width of base of pectoral fin	--- ---	--- ---	0.7 – 0.8
Longest pectoral fin ray	3.5 – 3.9	1.4 – 1.6	1.9 – 2.4
Longest ventral fin ray	--- ---	2.1 – 2.4	1.3 – 1.5
Length of ventral fin spine	--- ---	2.7 – 3.1	1.0 – 1.2
Length of first anal fin spine	--- ---	--- ---	0.5 – 0.8
Length of second anal fin spine	6.6 – 8.7	2.8 – 3.3	0.9 – 1.2
Length of third anal fin spine	--- ---	--- ---	0.9 – 1.1
Longest anal fin ray	6.2 – 7.3	2.5 – 3.0	1.0 – 1.3
Longest dorsal fin spine	6.5 – 7.1	2.6 – 2.9	1.1 – 1.2
Longest dorsal fin ray	7.3 – 7.6	2.6 – 3.0	1.0 – 1.1
Least depth of caudal peduncle	10.1 –12.0	4.2 – 4.6	0.7 – 0.8
Ventral length of caudal peduncle	--- ---	1.9 – 2.3	1.3 – 1.7
Dorsal length of caudal peduncle	--- ---	2.3 – 3.0	1.0 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.4
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.5

Number of rays in dorsal fin	12 or 13 (occas. 11 or 14)
Number of rays in anal fin	6 or 7 (occas. 8)
Number of rays in each pectoral fin	18 (occas. 17 or 19)
Unbranched rays in each pectoral fin	0–9
Number of rakers on first gill arch	32–37
Number of pores in lateral line	33–43
Diagonal rows of scales below lateral line	53–57

Number of specimens examined	7, plus 16
Size of specimens examined	9.0 – 14.0 inches

OTHER COMMON NAMES

Rosefish, lobe-jawed rockfish

FIGURE 33

AURORA ROCKFISH

Sebastodes aurora (Gilbert 1890)

Range—San Diego to Eureka, California.
Greatest depth taken and maximum size—240 fathoms; 13 inches.
Body color—Uniformly light-red or pink.
Mouth and gill cavities—White or pink; a dark blotch on underside of opercle.
Peritoneum—Dark gray with black dots or black.
Top of head, at mid-orbits—Slightly convex to slightly concave. Usually there is a narrow median groove between a pair of low, frontal ridges; the frontal ridges may be as high, or slightly higher than ocular ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchals present, strong and sharp. Coronal spines usually absent, but occasionally one or both of these are present.
Parietal ridges—Moderately high, thin.
The five preopercular spines—Strong and sharp; may be radially-directed, or the upper two directed backward.
The two opercular spines—Long, thin and sharp, the upper sometimes longer.
Supracleithral and cleithral spines—Both present, strong or weak.
Lower margin of suborbital bone—Two sharply triangular spines present; either of these may be divided into two or three points.
Lower posterior edge of gill cover—Spines usually absent.
Symphyseal knob—A small, pointed, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Slightly elevated, but not as a distinct patch.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Scales present, but sometimes only a patch.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus.
Second anal fin spine—Only a little thicker than third. Tip of second reaches to tip of third or a little beyond (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Rounded, with perhaps a slight anterior slant above.

Sebastodes aurora (Gilbert 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 3.2	1.1 – 1.2	2.6 – 3.7
Depth of body at origin of anal fin	3.5 – 4.8	1.5 – 1.9	1.7 – 2.6
Length of base of anal fin	6.8 – 8.3	2.9 – 3.3	1.1 – 1.3
Length of snout	9.9 –11.5	4.1 – 4.5	0.7 – 1.0
Width of orbit	8.2 – 9.9	3.2 – 4.1	--- ---
Width of interorbital space	--- ---	5.2 – 6.1	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	5.2 – 5.7	2.1 – 2.3	1.6 – 1.8
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	1.6 – 1.8
Width of base of pectoral fin	--- ---	--- ---	0.8 – 0.9
Longest pectoral fin ray	3.3 – 3.8	1.4 – 1.6	2.3 – 2.9
Longest ventral fin ray	--- ---	1.9 – 2.1	1.7 – 2.0
Length of ventral fin spine	--- ---	2.5 – 3.0	1.2 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	4.6 – 6.8	1.9 – 2.7	1.4 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.4
Longest anal fin ray	5.4 – 5.9	2.3 – 2.4	1.5 – 1.8
Longest dorsal fin spine	6.1 – 7.9	2.4 – 3.2	1.2 – 1.4
Longest dorsal fin ray	6.4 – 7.2	2.7 – 3.0	1.2 – 1.5
Least depth of caudal peduncle	9.6 –11.8	4.0 – 4.9	0.7 – 1.0
Ventral length of caudal peduncle	--- ---	2.1 – 2.4	1.5 – 1.8
Dorsal length of caudal peduncle	--- ---	2.9 – 3.3	1.1 – 1.3
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.5

Number of rays in dorsal fin	13 (occas. 14)
Number of rays in anal fin	6 (occas. 5)
Number of rays in each pectoral fin	17 or 18 (occas. 16)
Unbranched rays in each pectoral fin	0–6
Number of rakers on first gill arch	24–28
Number of pores in lateral line	27–30
Diagonal rows of scales below lateral line	45–50

Number of specimens examined	13, plus 8
Size of specimens examined	4.0 – 12.5 inches

FIGURE 34

CORAL-RED ROCKFISH

Sebastodes macdonaldi (Eigenmann & Beeson 1893)

Range—Thetis Bank, Baja California, to Santa Monica Bay, California.
Greatest depth taken and maximum size—65 fathoms; 24 inches.
Body color—Olive-brown to blackish-red dorsally, becoming plain red on lower sides; lateral line in a clear, red zone bordered by darker color; ventral and anal fins reddish, other fins darker.
Mouth and gill cavities—White and pink with some dusky areas; a dark blotch on underside of opercle.
Peritoneum—Gray with black dots, or black.
Top of head, at mid-orbits—Flat in small specimens to strongly convex in large specimens with a slight flattening next to each orbit.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchals present, moderately strong, rather prostrate. Nuchals sometimes coalesced with parietals. *Coronal spines absent.*
Parietal ridges—Low, sometimes partially scaled over.
The five preopercular spines—Usually, the upper two or three are longer than the remaining spines, and directed backward; the lowermost two or three tend to be directed downward.
The two opercular spines—Strong and long.
Supracleithral and cleithral spines—Supracleithral weak or absent; cleithral strong, sometimes double.
Lower margin of suborbital bone—Three or four spines present. In addition, a flat spine usually present on the upper part of suborbital bone, at anterior to orbit.
Lower posterior edge of gill cover—Spines usually absent.
Symphyseal knob—A broad knob is present, somewhat forward and downward-projecting.
Raised patch of teeth on tip of lower jaw—Present and not completely included by snout when jaws are closed.
End of maxillary—Under rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—Usually with some scales, occasionally without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals but fail to reach anus.
Second anal fin spine—Usually twice as thick as third. Tip of second fails to reach tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—Nearly vertical, or with a slight posterior slant.

Sebastodes macdonaldi (Eigenmann & Beeson 1893)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.9 – 3.1	1.1 – 1.2	3.0 – 4.1
Depth of body at origin of anal fin	4.0 – 4.3	1.6 – 1.7	2.2 – 3.1
Length of base of anal fin	7.3 – 7.7	2.7 – 3.1	1.2 – 1.6
Length of snout	9.4 –10.4	3.7 – 4.1	0.9 – 1.2
Width of orbit	9.4 –12.8	3.8 – 4.9	--- ---
Width of interorbital space	--- ---	4.2 – 4.8	0.8 – 1.2
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	5.2 – 5.5	2.1 – 2.2	1.7 – 2.3
Amount that lower jaw projects	--- ---	--- ---	0.3 – 0.6
Thickness of body	--- ---	--- ---	1.5 – 2.0
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.0
Longest pectoral fin ray	3.8 – 4.3	1.5 – 1.6	2.4 – 3.1
Longest ventral fin ray	--- ---	2.2	1.7 – 2.2
Length of ventral fin spine	--- ---	3.9 – 4.4	1.0 – 1.1
Length of first anal fin spine	--- ---	--- ---	0.4 – 0.5
Length of second anal fin spine	12.0 –15.0	4.8 – 5.6	0.7 – 0.9
Length of third anal fin spine	--- ---	--- ---	0.7 – 1.0
Longest anal fin ray	6.5 – 7.4	2.6 – 2.9	1.4 – 1.9
Longest dorsal fin spine	7.8 – 8.6	3.2 – 3.3	1.2 – 1.5
Longest dorsal fin ray	7.4 – 7.8	2.9 – 3.1	1.3 – 1.6
Least depth of caudal peduncle	12.0 –12.4	4.5 – 4.9	0.8 – 1.1
Ventral length of caudal peduncle	--- ---	1.9 – 2.2	1.8 – 2.5
Dorsal length of caudal peduncle	--- ---	2.6 – 2.8	1.4 – 1.8
Posterior of anus to origin of anal fin	--- ---	--- ---	0.2 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.6

Number of rays in dorsal fin	13
Number of rays in anal fin	7 or 8
Number of rays in each pectoral fin	19 (occas. 18)
Unbranched rays in each pectoral fin	6–9
Number of rakers on first gill arch	37–38
Number of pores in lateral line	53–58
Diagonal rows of scales below lateral line	77–87

Number of specimens examined	5
Size of specimens examined	11.7 – 23.0 inches

OTHER COMMON NAMES

Black-and-red rockfish, dark-chili

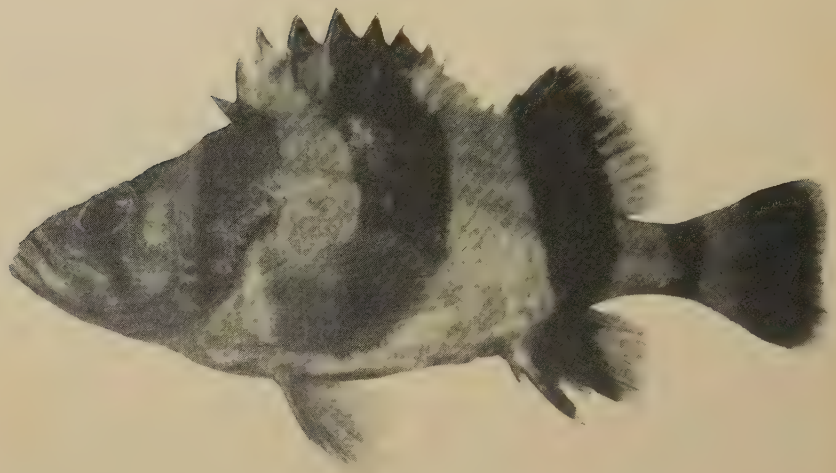

FIGURE 35

FLAG ROCKFISH

Sebastodes rubrivinctus (Jordan & Gilbert 1880)

Range—Santo Tomas Bay, Baja California to S. E. Alaska.
Greatest depth taken and maximum size—250 fathoms; 24 inches.
Body color—Light pink with several broad vertical dark-red bars on body. These bars are prominent in specimens less than about 15 inches length, but become faded in large specimens.
Mouth and gill cavities—Pinkish-white.
Peritoneum—May vary in different specimens from silvery white, or white with black dots or blotches, to uniformly black.
Top of head, at mid-orbits—Flat to moderately concave, with a narrow median groove between a pair of low frontal ridges.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, except that in an occasional specimen the tympanics may be absent; nuchals present in an occasional specimen. Spines moderately strong but rather prostrate. *Supraocular, coronal and occasionally nuchal spines, absent.*
Parietal ridges—Moderately strong, thin.
The five preopercular spines—Strong and sharp. Often the upper two are longer and directed backward, the lower three directed rather downward; occasionally radially-directed.
The two opercular spines—Strong and sharp, the upper sometimes longer.
Supracleithral and cleithral spines—Both present, strong.
Lower margin of suborbital bone—Two triangular spines present, the rearmost often multifid.
Lower posterior edge of gill cover—Spines usually absent.
Symphyseal knob—A low, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent (a slight elevation may be present).
End of maxillary—Under mid-orbit to rear of orbit.
Maxillaries—Usually with a patch of scales, occasionally naked.
Mandibles—Usually with a patch of fine scales, occasionally naked.
Branchiostegals—Fine scales present or absent.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus or beyond.
Second anal fin spine—Usually twice as thick as third.
Spinous dorsal fin membrane—Moderately to deeply incised.
Posterior profile of caudal fin.—Slightly convex or slightly indented.
Terminal profile of anal fin—Slightly convex (rounded) or nearly vertical.

Sebastodes rubrivinctus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into: Standard length	Frequency of measurement into: Head length	Frequency of orbit width into measurement
Length of head	2.5 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.9	1.0 – 1.1	3.2 – 4.2
Depth of body at origin of anal fin	3.2 – 3.7	1.3 – 1.4	2.5 – 3.2
Length of base of anal fin	6.4 – 7.7	2.5 – 3.0	1.3 – 1.7
Length of snout	8.4 –11.6	3.3 – 4.2	0.8 – 1.3
Width of orbit	8.8 –11.0	3.6 – 4.3	--- ---
Width of interorbital space	--- ---	4.5 – 7.2	0.5 – 0.9
Width of suborbital bone	--- ---	--- ---	0.2 – 0.4
Length of upper jaw	5.4 – 6.0	2.1 – 2.3	1.6 – 2.0
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	1.6 – 2.1
Width of base of pectoral fin	--- ---	--- ---	0.9 – 1.1
Longest pectoral fin ray	3.3 – 3.6	1.2 – 1.4	2.5 – 3.2
Longest ventral fin ray	--- ---	1.9 – 2.1	1.7 – 2.1
Length of ventral fin spine	--- ---	2.7 – 3.3	1.2 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.6 – 0.9
Length of second anal fin spine	5.6 – 8.0	2.2 – 3.2	1.3 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.4
Longest anal fin ray	5.3 – 6.3	2.0 – 2.6	1.6 – 1.9
Longest dorsal fin spine	5.2 – 7.3	2.0 – 2.7	1.4 – 2.0
Longest dorsal fin ray	5.8 – 7.1	2.3 – 2.6	1.4 – 1.8
Least depth of caudal peduncle	9.8 –11.3	3.8 – 4.5	0.9 – 1.1
Ventral length of caudal peduncle	--- ---	1.6 – 2.3	1.8 – 2.3
Dorsal length of caudal peduncle	--- ---	2.3 – 3.1	1.3 – 1.7
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number or rays in dorsal fin	13 or 14 (occas. 12)
Number of rays in anal fin	6 or 7
Number of rays in each pectoral fin	17–19 (occas. 20)
Unbranched rays in each pectoral fin	7–9 (occas. 5, 6 or 10)
Number of rakers on first gill arch	26–32
Number of pores in lateral line	40–47
Diagonal rows of scales below lateral line	48–59

Number of specimens examined	14, plus 14
Size of specimens examined	7.5 – 22.8 inches

OTHER COMMON NAMES

Spanish flag, barberpole, Hollywood, convict fish, shoflies, tiger

FIGURE 36

QUILLBACK ROCKFISH

Sebastodes maliger (Jordan & Gilbert 1880)

Range—Monterey, California to S. E. Alaska.
Greatest depth taken and maximum size—150 fathoms; 24 inches.
Body color—Slaty-brown mottled with yellow on anterior portion of body, and with orange-brown spotting on lower, anterior of body; fins all dark, except for anterior portion of spinous dorsal fin, which is splashed with yellow.
Mouth and gill cavities—White, with some yellow.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Slightly convex, flat or slightly concave, but with middle portion below tops of ocular ridges often slightly convex.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong and somewhat prostrate; tympanics not always strong, and occasionally one absent. *Supraocular, nuchal and coronal spines absent*, except that occasionally a supraocular will be present.
Parietal ridges—Strong and thin, usually irregular on top.
The five preopercular spines—Short, thick and radially-directed.
The two opercular spines—Thick and usually sharp.
Supracleithral and cleithral spines—Both present, strong.
Lower margin of suborbital bone—Spines weak, or absent.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A slight knob may be present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—About under rear of orbit.
Maxillaries—With some scales imbedded in the thick skin.
Mandibles—Usually without scales, but sometimes a few scales may be imbedded in the thick skin.
Branchiostegals—With a few scales.
Ends of pectoral and ventral fins—Tips of pectorals usually extend a little beyond tips of ventrals, may or may not reach anus, or beyond.
Second anal fin spine—Twice as thick as third. Tip of the second may reach to tip of third (spines depressed).
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Slightly convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes maliger (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into: Standard length	Frequency of measurement into: Head length	Frequency of orbit width into measurement
Length of head	2.4 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.5 – 2.7	1.0 – 1.1	3.7 – 4.3
Depth of body at origin of anal fin	3.4 – 3.6	1.3 – 1.5	2.8 – 3.1
Length of base of anal fin	6.3 – 6.8	2.4 – 2.9	1.5 – 1.7
Length of snout	10.0 –10.2	4.0 – 4.3	1.0 – 1.1
Width of orbit	9.8 –10.9	3.9 – 4.6	--- ---
Width of interorbital space	--- ---	5.5 – 6.6	0.6 – 0.8
Width of suborbital bone	--- ---	--- ---	0.3
Length of upper jaw	4.8 – 5.1	2.1 – 2.2	2.0 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	2.0 – 2.3
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.3
Longest pectoral fin ray	3.3 – 3.4	1.3 – 1.4	3.0 – 3.2
Longest ventral fin ray	--- ---	1.7 – 1.9	2.3 – 2.4
Length of ventral fin spine	--- ---	2.5 – 3.3	1.3 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	5.7 – 7.2	2.5 – 3.1	1.4 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.4 – 1.6
Longest anal fin ray	4.3 – 5.1	1.7 – 2.1	2.0 – 2.3
Longest dorsal fin spine	4.1 – 4.5	1.7 – 1.8	2.2 – 2.7
Longest dorsal fin ray	4.8 – 5.9	1.8 – 2.5	1.8 – 2.1
Least depth of caudal peduncle	8.8 – 9.3	3.4 – 3.9	1.1 – 1.2
Ventral length of caudal peduncle	--- ---	2.2 – 2.5	1.8 – 2.0
Dorsal length of caudal peduncle	--- ---	3.6 – 3.8	1.1 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.4

Number of rays in dorsal fin	13 or 14
Number of rays in anal fin	7 (occas. 6)
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 or 9
Number of rakers on first gill arch	30–33
Number of pores in lateral line	35–38
Diagonal rows of scales below lateral line	39–45

Number of specimens examined	4, plus 2
Size of specimens examined	9.0 – 19.0 inches

OTHER COMMON NAMES

Orange-spotted rockfish, yellow-backed rockfish, brown rockfish, speckled rockfish

FIGURE 37

COPPER ROCKFISH

Sebastodes caurinus (Richardson 1845)

Range—Monterey, California to S. E. Alaska.
Greatest depth taken and maximum size—50 fathoms; 20 inches.
Body color—Dark brown or olive brown, washed with copper-pink and occasionally splashed with dull yellow; latter two-thirds of lateral line and lower sides usually white in freshly caught specimens, the white becoming suffused with copper-pink on prolonged exposure.
Mouth and gill cavities—White, a dusky splotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Moderately convex to nearly flat, with a slight flattening next to each orbit; a slight median groove sometimes present.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, thick and rather prostrate. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately strong, rounded.
The five preopercular spines—Short and triangular in smaller specimens, most of the spines becoming bluntly divided into two or more points in larger specimens. Usually radially-directed but sometimes the upper two to four are directed backward.
The two opercular spines—Short and rather blunt; either may be bifid.
Supracleithral and cleithral spines—Both present, strong.
Lower margin of suborbital bone—Usually with a small lobe, followed by a larger, somewhat triangular projection.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—Absent, or only a slight knob present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of orbit.
Maxillaries—With an elongated patch of fine scales.
Mandibles—Without scales (the skin is pebbly).
Branchiostegals—Usually without scales, occasionally a few.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or beyond, may or may not reach anus, or beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second may fall a little short of tip of third spine, or it may extend slightly beyond.
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Nearly vertical, or slightly convex (rounded).
Terminal profile of anal fin—Lower corner of fin slightly rounded, with anterior slant above.

Sebastodes caurinus (Richardson 1845)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.5 – 2.8	1.0 – 1.1	3.9 – 5.2
Depth of body at origin of anal fin	3.2 – 3.5	1.2 – 1.4	3.2 – 4.1
Length of base of anal fin	6.2 – 7.2	2.3 – 2.8	1.7 – 2.1
Length of snout	9.3 –10.4	3.5 – 4.1	1.0 – 1.3
Width of orbit	10.6 –13.6	4.2 – 5.2	--- ---
Width of interorbital space	--- ---	5.4 – 6.3	0.7 – 0.9
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	4.9 – 5.4	1.9 – 2.1	2.0 – 2.5
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	2.3 – 3.1
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.4
Longest pectoral fin ray	3.2 – 3.8	1.3 – 1.4	3.2 – 3.9
Longest ventral fin ray	--- ---	1.6 – 1.9	2.4 – 2.9
Length of ventral fin spine	--- ---	2.5 – 3.1	1.6 – 1.8
Length of first anal fin spine	--- ---	--- ---	0.8 – 1.1
Length of second anal fin spine	5.2 – 7.9	2.0 – 2.9	1.6 – 2.2
Length of third anal fin spine	--- ---	--- ---	1.6 – 1.9
Longest anal fin ray	4.4 – 5.5	1.6 – 2.1	2.1 – 3.1
Longest dorsal fin spine	4.5 – 5.3	1.7 – 2.0	2.1 – 2.9
Longest dorsal fin ray	5.1 – 5.8	2.0 – 2.3	2.1 – 2.5
Least depth of caudal peduncle	8.1 – 9.0	3.1 – 3.5	1.2 – 1.6
Ventral length of caudal peduncle	--- ---	1.9 – 2.1	2.0 – 2.6
Dorsal length of caudal peduncle	--- ---	3.0 – 3.5	1.2 – 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.5

Number of rays in dorsal fin	13 (occas. 12)
Number of rays in anal fin	6 (occas. 5)
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 (occas. 7 or 9)
Number of rakers on first gill arch	27–31
Number of pores in lateral line	39–45
Diagonal rows of scales below lateral line	41–50

Number of specimens examined	14, plus 6
Size of specimens examined	6.5 – 15.2 inches

OTHER COMMON NAMES

Whitebelly rockfish, white gopher, barriga blanca, Palermotana

FIGURE 38

WHITEBELLY ROCKFISH
Sebastodes vexillaris (Jordan & Gilbert 1880)

Range—Cape Colnett, Baja California to Crescent City, California.
Greatest depth taken and maximum size—50 fathoms; 20 inches.
Body color—Dull yellow and olive-pink, these colors forming large, irregular areas; whitish ventrally. In smaller specimens the latter two-thirds of lateral line, and lower sides, may be white becoming darker upon prolonged exposure, as in *S. caurinus*.
Mouth and gill cavities—White, usually a dusky splotch on underside of opercle.
Peritoneum—Silvery-white.
Top of head at mid-orbits—Moderately convex to slightly concave; slight median groove sometimes present.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, except that occasionally one or both tympanics may be absent. Spines thick and rather prostrate. Nuchals present or absent. *Supraocular and coronal spines absent.*
Parietal ridges—Moderately strong, rounded.
The five preopercular spines—Short and triangular in small fish, most of them becoming bluntly divided into two or more points in large specimens. Usually radially-directed but sometimes the upper two to four directed backward.
The two opercular spines—Short, rather blunt; may be bifid.
Supracleithral and cleithral spines—Strong; may be double.
Lower margin of suborbital bone—Usually with a small lobe, followed by a larger, triangular projection.
Lower posterior edge of gill cover—Spines present; sometimes serrated.
Symphyseal knob—Absent, or only a slight knob present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of orbit.
Maxillaries—Without scales, or with only a patch of fine scales.
Mandibles—Without scales (the skin is slack and pebbly).
Branchiostegals—Usually without scales.
Ends of pectoral and ventral fins—Tips of pectorals reach tips of ventrals or beyond, sometimes to anus or beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second about to tip of third (spines depressed).
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Truncate or slightly convex (rounded).
Terminal profile of anal fin—Lower corner rounded, with anterior slant above.

Sebastodes vexillaris (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into: Standard length	Frequency of measurement into: Head length	Frequency of orbit width into measurement
Length of head	2.4 - 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.4 - 3.1	1.0 - 1.1	3.0 - 5.1
Depth of body at origin of anal fin	3.2 - 3.9	1.3 - 1.6	2.8 - 3.9
Length of base of anal fin	6.4 - 7.7	2.6 - 3.1	1.4 - 1.9
Length of snout	9.2 -10.6	3.8 - 4.1	1.0 - 1.2
Width of orbit	9.8 -12.4	3.9 - 5.1	--- ---
Width of interorbital space	--- ---	4.8 - 6.7	0.6 - 0.9
Width of suborbital bone	--- ---	--- ---	0.2 - 0.4
Length of upper jaw	4.8 - 5.4	2.0 - 2.1	2.1 - 2.4
Amount that lower jaw projects	--- ---	--- ---	0.0 - 0.2
Thickness of body	--- ---	--- ---	1.8 - 2.8
Width of base of pectoral fin	--- ---	--- ---	1.0 - 1.4
Longest pectoral fin ray	3.1 - 3.7	1.2 - 1.4	3.0 - 4.0
Longest ventral fin ray	--- ---	1.8 - 2.0	2.1 - 2.9
Length of ventral fin spine	--- ---	2.9 - 3.5	1.3 - 1.5
Length of first anal fin spine	--- ---	--- ---	0.6 - 0.8
Length of second anal fin spine	5.8 - 8.2	2.3 - 3.3	1.4 - 1.7
Length of third anal fin spine	--- ---	--- ---	1.3 - 1.5
Longest anal fin ray	4.9 - 5.8	1.9 - 2.3	1.9 - 2.5
Longest dorsal fin spine	4.2 - 5.9	1.7 - 2.3	1.9 - 3.0
Longest dorsal fin ray	5.4 - 6.0	2.2 - 2.5	1.8 - 2.2
Least depth of caudal peduncle	8.2 - 9.2	3.3 - 3.7	1.2 - 1.5
Ventral length of caudal peduncle	--- ---	1.9 - 2.4	1.8 - 2.2
Dorsal length of caudal peduncle	--- ---	3.0 - 3.6	1.1 - 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 - 0.6
Longest raker on first gill arch	--- ---	--- ---	0.3 - 0.4

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6 (occas. 5)
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	27–30
Number of pores in lateral line	39–45
Diagonal rows of scales below lateral line	42–48

Number of specimens examined	14, plus 22
Size of specimens examined	8.0 – 19.0 inches

OTHER COMMON NAMES

Sailfin rockfish, barriga blanca, Palermotana

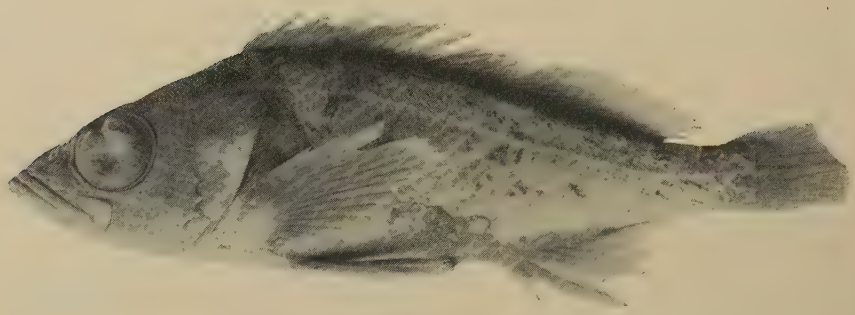

FIGURE 39

PYGMY ROCKFISH
Sebastodes wilsoni Gilbert 1915

Range—Monterey, California to Vancouver, British Columbia.
Greatest depth taken and maximum size—70 fathoms, 7½ inches.
Body color—Light brown, flushed with red; about four dark blotches along base of dorsal fin; a brownish-red stripe below lateral line.
Mouth and gill cavities—Whitish.
Peritoneum—Black.
Top of head, at mid-orbits—Flat to slightly but flatly concave.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, moderately strong. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Moderately strong, sharp, radially-directed.
The two opercular spines—Moderately long and sharp.
Supracleithral and cleithral spines—Strong; the cleithral occasionally double.
Lower margin of suborbital bone—Spines absent, but two small projections usually present.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A slight, downward-projecting knob may be present, or absent.
Raised patch of teeth on tip of lower jaw—Absent, or only slightly raised.
End of maxillary—Under mid-orbit, or slightly less.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend a little beyond tips of ventrals; tips of ventrals usually to anus, and tips of pectorals a little beyond.
Second anal fin spine—Hardly twice as thick as third. Tip of the second extends beyond tip of third by about one-quarter of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Truncate, or slightly convex (rounded).
Terminal profile of anal fin—Nearly vertical, or with slight posterior slant.

Sebastodes wilsoni Gilbert 1915

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.7 – 2.9	--- ---	--- ---
Depth of body at origin of ventral fins	3.4 – 3.7	1.2 – 1.4	2.3 – 2.5
Depth of body at origin of anal fin	4.2 – 4.4	1.4 – 1.6	1.9 – 2.1
Length of base of anal fin	6.6 – 6.7	2.3 – 2.5	1.2 – 1.3
Length of snout	10.9 –12.1	4.0 – 4.2	0.7 – 0.8
Width of orbit	8.3 – 8.6	3.0 – 3.1	--- ---
Width of interorbital space	--- ---	4.7 – 5.8	0.5 – 0.6
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	6.9	2.4 – 2.6	1.2
Amount that lower jaw projects	--- ---	--- ---	0.2
Thickness of body	--- ---	--- ---	1.2 – 1.4
Width of base of pectoral fin	--- ---	--- ---	0.8
Longest pectoral fin ray	3.6	1.2	2.4
Longest ventral fin ray	--- ---	1.7 – 1.8	1.7
Length of ventral fin spine	--- ---	2.2 – 2.5	1.3 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.7
Length of second anal fin spine	5.0 – 5.4	1.8	1.6 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.3
Longest anal fin ray	--- ---	--- ---	--- ---
Longest dorsal fin spine	7.6 – 7.8	2.6 – 2.8	1.1
Longest dorsal fin ray	--- ---	--- ---	--- ---
Least depth of caudal peduncle	11.3 –12.4	3.9 – 4.6	0.7 – 0.8
Ventral length of caudal peduncle	--- ---	1.6 – 1.7	1.8 – 1.9
Dorsal length of caudal peduncle	--- ---	2.5 – 2.7	1.1 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4
Longest raker on first gill arch	--- ---	--- ---	0.4

Number of rays in dorsal fin	13 or 14
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 (occas. 16)
Unbranched rays in each pectoral fin	7 or 8
Number of rakers on first gill arch	38–43
Number of pores in lateral line	39–41
Diagonal rows of scales below lateral line	45–50

Number of specimens examined	3
Size of specimens examined	4.0 – 5.2 inches

OTHER COMMON NAMES

Wilson's rockfish, slender rockfish

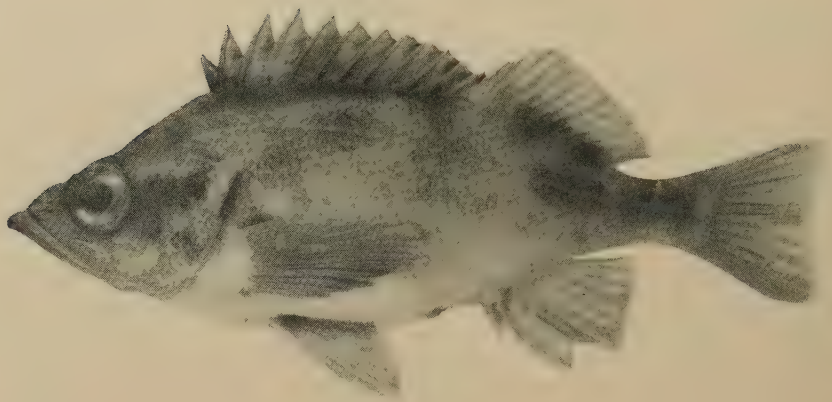

FIGURE 40

SHARPCHIN ROCKFISH

Sebastodes zacentrus (Gilbert 1890)

Range—San Diego, California to Southern British Columbia.
Greatest depth taken and maximum size—50 fathoms; 13 inches.
Body color—Light red with several vague, dark brown blotches on back; usually present on side of head is a forked, dark bar backward from rear of orbit.
Mouth and gill cavities—Pink and white, usually with some patches of yellow and some dusky stippling; a black blotch on underside of opercle.
Peritoneum—Black.
Top of head, at mid-orbits—Slightly convex to slightly concave.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong and sharp. *Supraocular, coronal and nuchal spines absent*, except that a nuchal or a supraocular may be rarely present.
Parietal ridges—Moderately high, thin.
The five preopercular spines—Sharp, the upper two or three sometimes directed rather backward.
The two opercular spines—Moderately long, sharp.
Supracleithral and cleithral spines—Both moderately strong.
Lower margin of suborbital bone—Two bluntly triangular spines present, the rearmost sometimes bifid; a short ridge above these forms a shallow shelf under the two nostril openings.
Lower posterior edge of gill cover—Spines usually absent, but occasionally a spine present on one side.
Symphyseal knob—A strong knob is present, directed forward and backward.
Raised patch of teeth on tip of lower jaw—A strongly raised patch of teeth is present, and this tends to fit outside of snout.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or slightly beyond. Tips of pectorals to anus, in small specimens, but about one-third of orbit width less, in large fish.
Second anal fin spine—Twice as thick as third in large specimens, but hardly thicker than third in small. Tip of second extends a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Nearly vertical.

Sebastodes zacentrus (Gilbert 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.7 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.2	1.0 – 1.2	2.5 – 3.4
Depth of body at origin of anal fin	3.5 – 4.0	1.3 – 1.5	1.9 – 2.6
Length of base of anal fin	6.1 – 7.0	2.3 – 2.6	1.1 – 1.4
Length of snout	10.8 –12.0	4.0 – 4.4	0.7 – 0.8
Width of orbit	7.6 – 9.3	2.9 – 3.4	--- ---
Width of interorbital space	--- ---	4.5 – 5.6	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	5.9 – 6.4	2.1 – 2.3	1.3 – 1.6
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.3
Thickness of body	--- ---	--- ---	1.2 – 1.6
Width of base of pectoral fin	--- ---	--- ---	0.7 – 0.9
Longest pectoral fin ray	3.5 – 3.9	1.3 – 1.4	2.0 – 2.6
Longest ventral fin ray	--- ---	1.7 – 1.9	1.6 – 2.0
Length of ventral fin spine	--- ---	2.2 – 2.8	1.2 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	4.7 – 6.0	1.7 – 2.1	1.5 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	5.6 – 6.0	2.0 – 2.1	1.5 – 1.7
Longest dorsal fin spine	6.7 – 8.0	2.3 – 2.8	1.1 – 1.3
Longest dorsal fin ray	6.6 – 7.1	2.4 – 2.6	1.2 – 1.4
Least depth of caudal peduncle	10.3 –11.0	3.7 – 4.2	0.7 – 0.9
Ventral length of caudal peduncle	--- ---	1.8 – 2.0	1.5 – 1.8
Dorsal length of caudal peduncle	--- ---	2.8 – 3.1	0.9 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.5

Number of rays in dorsal fin	14 or 15 (occas. 13)
Number of rays in anal fin	7
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	33–37
Number of pores in lateral line	39–45
Diagonal rows of scales below lateral line	43–50

Number of specimens examined	10, plus 5
Size of specimens examined	6.5–13.2 inches

FIGURE 41

TURKEY-RED ROCKFISH
Sebastodes ruberrimus Cramer 1895

Range—Ensenada, Baja California to Gulf of Alaska.
Greatest depth taken and maximum size—150 fathoms; 36 inches.
Body color—Red on back, becoming orange-yellow on sides; most fins usually with black on terminal portions. Young specimens under about 12 inches length, red; a whitish stripe along lateral line, another shorter stripe between lateral line and the ventral surface; fins with blackened tips.
Mouth and gill cavities—Mainly white, with some light pink or yellow.
Peritoneum—Silvery white, with a few scattered black dots.
Top of head, at mid-orbits—Shallowly and flatly concave; a narrow median groove, with a faint frontal ridge on either side usually present.
Spines on top of head—In specimens over about 12 inches length, the ocular ridges become increasingly rugose, the accessory points making identification of spines difficult. In specimens under 12 inches, the nasal, preocular, supraocular, post-ocular, tympanic and parietal spines can be identified; nuchals present or absent; coronals usually absent, but one occasionally present.
Parietal ridges—Strong, high and rugose in adults; smooth in young.
The five preopercular spines—Short, thick and rather radially-directed; some may be divided into more than one point at tips.
The two opercular spines—Short, thick and bluntly sharp, sometimes bifid.
Supracleithral and cleithral spines—Strong, sometimes bifid.
Lower margin of suborbital bone—Usually with a small lobe, followed by a larger, somewhat triangular projection.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A low, broad, rounded knob is present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Usually without scales, but sometimes a patch of scales is present.
Mandibles—Without scales.
Branchiostegals—Without Scales.
End of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or a little beyond, but not to anus.
Second anal fin spine—Twice as thick as third. Tip of second may fall a little short of tip of third or may extend slightly beyond.
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Nearly vertical, or with a slight indentation, the upper and lower corners slightly rounded.
Terminal profile and anal fin—Convex (rounded).

Sebastodes ruberrimus Cramer 1895

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.4 – 3.0	1.0 – 1.2	3.6 – 5.0
Depth of body at origin of anal fin	3.3 – 4.0	1.4 – 1.6	2.7 – 3.5
Length of base of anal fin	6.6 – 7.1	2.6 – 3.0	1.6 – 1.7
Length of snout	8.6 – 9.5	3.6 – 4.0	1.2 – 1.3
Width of orbit	10.9 –12.5	4.3 – 5.1	--- ---
Width of interorbital space	--- ---	5.7 – 7.0	0.6 – 0.9
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	4.7 – 5.1	2.0 – 2.1	2.1 – 2.5
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	1.8 – 2.8
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.3
Longest pectoral fin ray	3.9 – 4.2	1.5 – 1.8	2.7 – 3.2
Longest ventral fin ray	--- ---	1.8 – 2.1	2.2 – 2.6
Length of ventral fin spine	--- ---	3.0 – 3.5	1.3 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.6 – 0.8
Length of second anal fin spine	6.5 – 9.1	2.6 – 3.7	1.2 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.3 – 1.4
Longest anal fin ray	5.2 – 5.8	2.1 – 2.4	1.9 – 2.4
Longest dorsal fin spine	6.4 – 6.8	2.5 – 2.8	1.6 – 1.8
Longest dorsal fin ray	6.0 – 7.5	2.4 – 3.1	1.5 – 1.9
Least depth of caudal peduncle	9.2 –10.5	3.7 – 4.3	1.1 – 1.3
Ventral length of caudal peduncle	--- ---	2.1 – 2.4	1.9 – 2.2
Dorsal length of caudal peduncle	--- ---	3.3 – 3.6	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	15 (occas. 13 or 14)
Number of rays in anal fin	7
Number of rays in each pectoral fin	19 (occas. 18 or 20)
Unbranched rays in each pectoral fin	9 or 10 (occas. 8)
Number of rakers on first gill arch	26–30
Number of pores in lateral line	40–43
Diagonal rows of scales below lateral line	45–50

Number of specimens examined	6, plus 11
Size of specimens examined	8.7–22.5 inches

OTHER COMMON NAMES

Red snapper, pot belly, drum, tambor, vecchia, red rock cod

FIGURE 42

BRONZESPOTTED ROCKFISH
Sebastodes gilli Eigenmann & Eigenmann 1891

Range—Ensenada, Baja California to Monterey, California.
Greatest depth taken and maximum size—80 fathoms; 24 inches.
Body color—Red, with some light dusky on back; bronze-colored spots on upper sides and back, including base of dorsal fin; a light-colored blotch under anterior portion, and another under posterior portion of soft dorsal fin; lateral line in a narrow, pink zone.
Mouth and gill cavities—Pink and white, with dusky patches; a dark blotch on underside of opercle.
Peritoneum—Light gray with a few scattered black dots.
Top of head, at mid-orbits—Shallowly and flatly concave; occasionally a slight median groove is present.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchals present, thick; occasionally a nuchal spine is double. *Coronal spines absent.*
Parietal ridges—High and thick.
The five preopercular spines—Thick and usually radially-directed, except that the upper two or three are directed backward.
The two opercular spines—Strong, sharp or blunt.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Two strong spines present, directed rather backward.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A broad, low, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—Absent, or only a slight elevation present.
End of maxillary—Under rear of orbit.
Maxillaries—Usually without scales but occasionally with an elongate patch.
Mandibles—Without scales.
Branchiostegals—A few scales may be present.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, but do not reach anus.
Second anal fin spine—Twice as thick as third. Tip of the second reaches approximately to tip of third.
Spinous dorsal fin membrane—Moderately to deeply incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Slightly convex, or nearly vertical.

Sebastodes gilli Eigenmann & Eigenmann 1891

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6 – 2.8	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.1	1.1	4.1 – 4.6
Depth of body at origin of anal fin	4.2 – 4.5	1.5 – 1.7	2.6 – 3.0
Length of base of anal fin	7.9 – 8.8	2.9 – 3.4	1.4 – 1.6
Length of snout	11.5 –11.8	4.2 – 4.5	1.0 – 1.1
Width of orbit	12.4 –12.8	4.6 – 4.8	--- ---
Width of interorbital space	--- ---	6.0 – 6.8	0.7 – 0.8
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	5.0 – 5.4	1.9	2.4 – 2.5
Amount that lower jaw projects	--- ---	--- ---	0.3 – 0.4
Thickness of body	--- ---	--- ---	1.9 – 2.2
Width of base of pectoral fin	--- ---	--- ---	1.2 – 1.3
Longest pectoral fin ray	3.7 – 3.9	1.4	3.3 – 3.4
Longest ventral fin ray	--- ---	1.9 – 2.1	2.3 – 2.5
Length of ventral fin spine	--- ---	3.5 – 3.7	1.3 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.6
Length of second anal fin spine	8.6 –10.4	3.3 – 3.8	1.2 – 1.5
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.3
Longest anal fin ray	5.8 – 6.7	2.2 – 2.5	1.9 – 2.2
Longest dorsal fin spine	7.1 – 7.8	2.7 – 2.8	1.6 – 1.8
Longest dorsal fin ray	6.8 – 7.5	2.6 – 2.7	1.7 – 1.9
Least depth of caudal peduncle	12.3 –12.5	4.4 – 4.8	1.0
Ventral length of caudal peduncle	--- ---	2.0 – 2.3	2.1 – 2.3
Dorsal length of caudal peduncle	--- ---	2.7 – 3.0	1.6 – 1.7
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.2

Number of rays in dorsal fin	12 or 13
Number of rays in anal fin	7 or 8
Number of rays in each pectoral fin	18 or 19 (occas. 20)
Unbranched rays in each pectoral fin	8–10
Number of rakers on first gill arch	26–29
Number of pores in lateral line	41–45
Diagonal rows of scales below lateral line	51–63

Number of specimens examined	3, plus 2
Size of specimens examined	19.0–24.0 inches

OTHER COMMON NAMES

Catalina, Catalina bass, Catalina salmon

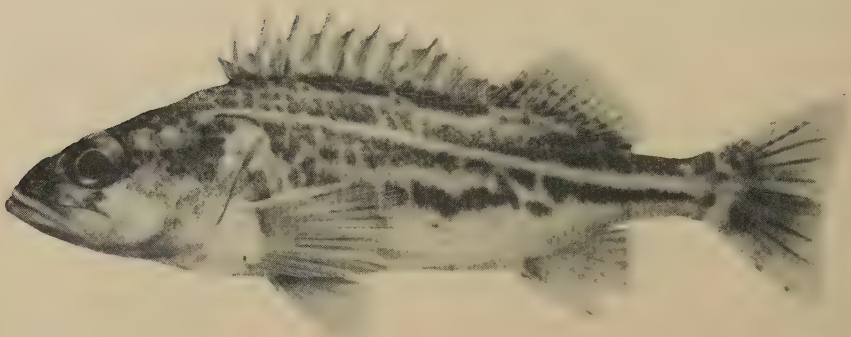

FIGURE 43

GREENSTRIPED ROCKFISH
Sebastodes elongatus (Ayres 1859)

Range—Cedros Island, Baja California to Vancouver Island, B. C.
Greatest depth taken and maximum size—130 fathoms; 15 inches.
Body color—Pink, with four irregular, horizontal, green stripes on each side of body. These stripes, which join near the tail, are separated by a pink stripe extending along the lateral line.
Mouth and gill cavities—White, with some pink.
Peritoneum—Gray with black dots.
Top of head, at mid-orbits—Shallowly and broadly concave; a slight median groove, with a low frontal ridge on either side sometimes evident.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, moderately strong. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Radially-directed, or directed rather backward, the upper two usually the longest.
The two opercular spines—Moderately strong and sharp.
Supracleithral and cleithral spines—Moderately strong.
Lower margin of suborbital bone—Without spines; small humps may be present.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A slight knob may be present or absent.
Raised patch of teeth on tip of lower jaw—Moderately elevated, but not as a distinctly raised patch.
End of maxillary—Under mid-orbit, or rear of pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus.
Second anal fin spine—About twice as thick as third. Tip of second extends beyond tip of third by about one-quarter of orbit width (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile of anal fin—Nearly vertical.

Sebastodes elongatus (Ayres 1859)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.6	--- ---	--- ---
Depth of body at origin of ventral fins	3.1 – 3.7	1.2 – 1.4	2.4 – 3.0
Depth of body at origin of anal fin	4.4 – 5.2	1.7 – 1.9	1.7 – 2.2
Length of base of anal fin	7.7 – 8.2	3.0 – 3.1	1.1 – 1.3
Length of snout	10.0 –11.0	3.8 – 4.2	0.8 – 1.0
Width of orbit	8.5 –10.6	3.2 – 4.0	--- ---
Width of interorbital space	--- ---	7.0 – 8.1	0.4 – 0.5
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	5.7 – 5.9	2.1 – 2.3	1.5 – 2.3
Amount that lower jaw projects	--- ---	--- ---	0.2
Thickness of body	--- ---	--- ---	1.4 – 1.9
Width of base of pectoral fin	--- ---	--- ---	0.7 – 0.9
Longest pectoral fin ray	3.4 – 3.5	1.3	2.5 – 3.0
Longest ventral fin ray	--- ---	2.0 – 2.1	1.6 – 1.9
Length of ventral fin spine	--- ---	2.8 – 3.2	1.1 – 1.3
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	5.8 – 6.5	2.2 – 2.5	1.3 – 1.6
Length of third anal fin spine	--- ---	--- ---	0.9 – 1.3
Longest anal fin ray	5.7 – 7.3	2.2 – 2.8	1.3 – 1.7
Longest dorsal fin spine	7.3 – 7.9	2.8 – 3.1	1.2 – 1.3
Longest dorsal fin ray	7.8 – 8.3	3.0 – 3.2	1.2 – 1.3
Least depth of caudal peduncle	11.4 –13.4	4.4 – 5.1	0.7 – 0.8
Ventral length of caudal peduncle	--- ---	1.8 – 2.1	1.7 – 2.1
Dorsal length of caudal peduncle	--- ---	2.6 – 3.0	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.5

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6
Number of rays in each pectoral fin	16 or 17
Unbranched rays in each pectoral fin	7 or 8
Number of rakers on first gill arch	28–33
Number of pores in lateral line	40–45
Diagonal rows of scales below lateral line	42–55

Number of specimens examined	4, plus 6
Size of specimens examined	9.5 – 13.5 inches

OTHER COMMON NAMES

Strawberry rockfish, serena, reina, poinsetta, striped rockfish

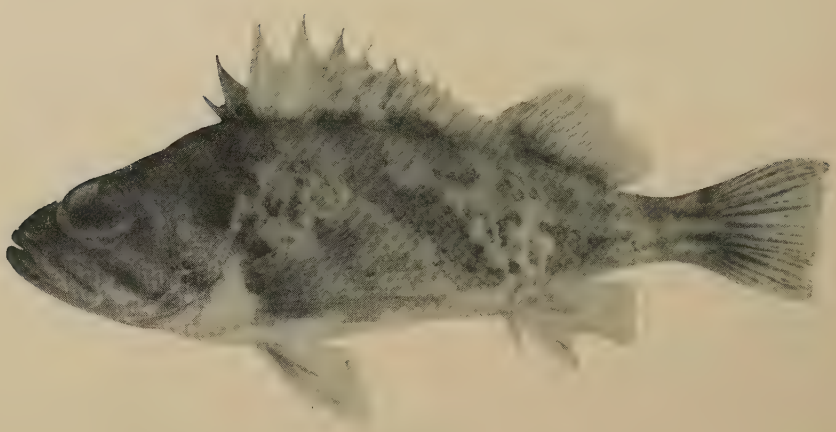

FIGURE 44

CALICO ROCKFISH

Sebastodes dalli (Eigenmann & Beeson 1894)

Range—Cape Colnett, Baja California to Santa Barbara, California.
Greatest depth taken and maximum size—25 fathoms; 8 inches.
Body color—Light yellow-green with irregular and diverse brown bars, splotches and spots on body and brown streaks and spots on caudal fin.
Mouth and gill cavities—White, sometimes with pink and yellow and light dusky stippling; an olive-green splotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Usually moderately concave, but occasionally nearly flat, with a narrow median groove bordered by low frontal ridges.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong. *Supraocular, coronal and nuchal spines absent*, except that occasionally a nuchal spine may be present.
Parietal ridges—Moderately strong, thin.
The five preopercular spines—Moderately strong, sharp, and usually radially-directed, but occasionally the upper two are directed backward.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Moderately strong.
Lower margin of suborbital bone—Usually with a small, rounded projection anteriorly and a triangular spine posteriorly.
Lower posterior edge of gill cover—Usually with small spines.
Symphyseal knob—A small, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Present or absent.
End of maxillary—Under mid-orbit, or rear of pupil.
Maxillaries—Usually without scales, occasionally with a patch of scales.
Mandibles—Without scales.
Branchiostegals—Usually without scales, occasionally with a few scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals by about one-half orbit width, reaching anus or beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second extends slightly beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Truncate, or slightly indented.
Terminal profile of anal fin—Nearly vertical, or with slight anterior-slant.

Sebastodes dalli (Eigenmann & Beeson 1894)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.3	1.1 – 1.2	2.9 – 3.3
Depth of body at origin of anal fin	3.8 – 4.2	1.5 – 1.6	2.3 – 2.4
Length of base of anal fin	6.8 – 7.6	2.6 – 2.9	1.3 – 1.5
Length of snout	9.8 –11.6	3.9 – 4.3	0.8 – 0.9
Width of orbit	8.8 – 9.8	3.5 – 3.7	--- ---
Width of interorbital space	--- ---	6.6 – 7.1	0.5
Width of suborbital bone	--- ---	--- ---	0.2
Length of upper jaw	3.0 – 3.3	2.1 – 2.2	1.6 – 1.8
Amount that lower jaw projects	--- ---	--- ---	0.2
Thickness of body	--- ---	--- ---	1.7 – 1.8
Width of base of pectoral fin	--- ---	--- ---	0.9
Longest pectoral fin ray	3.0 – 3.3	1.2 – 1.3	2.9 – 3.0
Longest ventral fin ray	--- ---	1.7 – 1.9	1.9 – 2.1
Length of ventral fin spine	--- ---	2.7 – 2.9	1.2 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	5.7 – 5.8	2.2 – 2.3	1.5 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	5.6 – 6.2	2.1 – 2.4	1.5 – 1.8
Longest dorsal fin spine	5.5 – 6.0	2.1 – 2.4	1.5 – 1.8
Longest dorsal fin ray	5.9 – 7.1	2.4 – 2.6	1.4 – 1.5
Least depth of caudal peduncle	10.2 –11.1	3.8 – 4.1	0.9 – 1.0
Ventral length of caudal peduncle	--- ---	2.1 – 2.3	1.6 – 1.7
Dorsal length of caudal peduncle	--- ---	2.8 – 3.1	1.2 – 1.3
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.5

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6
Number of rays in each pectoral fin	16 or 17
Unbranched rays in each pectoral fin	7–9
Number of rakers on first gill arch	31–34
Number of pores in lateral line	38–42
Diagonal rows of scales below lateral line	42–48

Number of specimens examined	3, plus 7
Size of specimens examined	5.7 – 6.7 inches

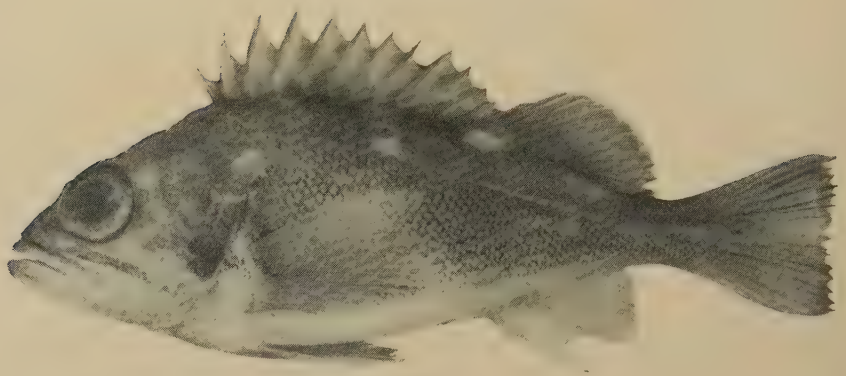

FIGURE 45

HONEYCOMB ROCKFISH

Sebastodes umbrosus (Jordan & Gilbert 1882)

Range—Guadalupe Island, Baja California to Pt. Conception, California.
Greatest depth taken and maximum size—50 fathoms; 18 inches.
Body color—Light orange, overlaid everywhere with fine, blackish dots around the margins of the scales, thus giving a honeycomb appearance; three to five clear, whitish blotches on back; fins, orange.
Mouth and gill cavities—Mouth orange mottled with dusky; gill cavity white with some yellow and dusky, a dark blotch on underside of opercle.
Peritonem—Brown with black dots, or black.
Top of head, at mid-orbits—Strongly concave; the groove at bottom of concavity with a low, frontal ridge on either side.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, strong and sharp. *Coronal and nuchal spines absent*, except that rarely a coronal spine is present.
Parietal ridges—Moderately high and thin.
The five preopercular spines—Moderately strong, sharp and usually radially-directed; occasionaly the upper two are close together and directed backward.
The two opercular spines—Moderately strong and sharp; the upper sometimes the longer.
Supracleithral and cleithral spines—Moderately strong.
Lower margin of suborbital bone—Two triangular spines present, the rearmost sometimes bifid.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A small but prominent, downward-projecting knob present.
Raised patch of teeth on top of lower jaw—Absent, or slightly raised.
End of maxillary—Under mid-orbit.
Maxillaries—Scales present.
Mandibles—Well covered with scales, but these somewhat imbedded.
Branchiostegals—With or without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus or slightly beyond.
Second anal fin spine—Twice as thick as third. Tip of second extends a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Moderately indented.
Terminal profile and anal fin—Vertical, or with a slight anterior slant.

Sebastodes umbrosus (Jordan & Gilbert 1882)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 – 2.9	1.0 – 1.2	2.8 – 3.7
Depth of body at origin of anal fin	3.6 – 4.0	1.4 – 1.6	2.1 – 2.7
Length of base of anal fin	6.8 – 7.5	2.7 – 3.0	1.1 – 1.3
Length of snout	9.3 –11.2	3.8 – 4.4	0.8 – 1.0
Width of orbit	8.1 – 9.1	3.2 – 3.7	--- ---
Width of interorbital space	--- ---	5.6 – 6.0	0.6 – 0.7
Width of suborbital bone	--- ---	--- ---	0.2
Length of upper jaw	5.0 – 5.8	2.0 – 2.3	1.5 – 1.8
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.2
Thickness of body	--- ---	--- ---	1.5 – 1.8
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.0
Longest pectoral fin ray	3.2 – 3.5	1.3 – 1.4	2.4 – 2.9
Longest ventral fin ray	--- ---	1.8 – 1.9	1.8 – 2.1
Length of ventral fin spine	--- ---	2.5 – 2.8	1.3 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.8
Length of second anal fin spine	4.8 – 5.3	1.9 – 2.1	1.6 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.3
Longest anal fin ray	5.1 – 5.6	2.1 – 2.3	1.5 – 1.8
Longest dorsal fin spine	5.6 – 6.5	2.4 – 2.5	1.3 – 1.5
Longest dorsal fin ray	6.3 – 7.0	2.5 – 2.8	1.2 – 1.5
Least depth of caudal peduncle	10.0 –11.3	4.1 – 4.5	0.7 – 0.9
Ventral length of caudal peduncle	--- ---	2.2 – 2.4	1.5 – 1.6
Dorsal length of caudal peduncle	--- ---	2.8 – 3.3	1.1 – 1.2
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.4

Number of rays in dorsal fin	12 or 13
Number of rays in anal fin	6 (occas. 7)
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 (occas. 9)
Number of rakers on first gill arch	34–36
Number of pores in lateral line	35–39
Diagonal rows of scales below lateral line	40–50

Number of specimens examined	7, plus 8
Size of specimens examined	7.0 – 10.2 inches

OTHER COMMON NAMES

Shaded rockfish, dusky rockfish

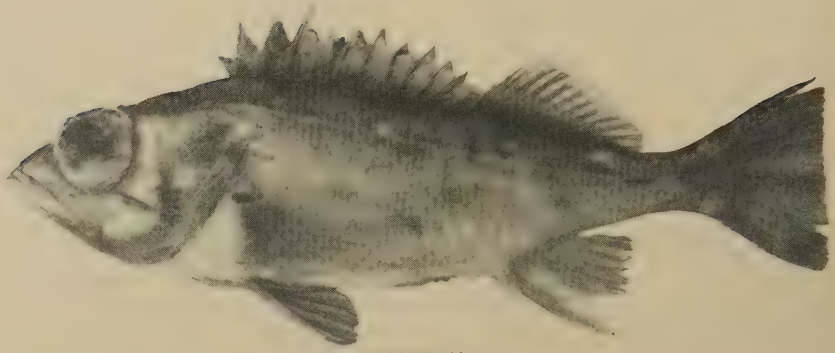

FIGURE 46

SWORDSPINE ROCKFISH

Sebastodes rhodochloris (Jordan & Gilbert 1880)

Range—Guadalupe I, Baja California to San Francisco, California.
Greatest depth taken and maximum size—70 fathoms; 12 inches.
Body color—Light-red, washed with green above lateral line and with yellow below; three or four whitish blotches, bordered with light-green, on back; fins red with yellow-green membranes.
Mouth and gill cavities—Yellow and pink, with some light dusky areas in gill cavity.
Peritoneum—Dark gray with black dots, or black.
Top of head, at mid-orbits—Moderately concave, with a median groove bordered on each side by a low frontal ridge.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, moderately strong and sharp. *Coronal and nuchal spines absent.*
Parietal ridges—Moderately high, thin.
The five preopercular spines—Moderately strong, sharp; radially-directed, or the upper two directed backward.
The two opercular spines—Moderately long, thin, sharp.
Supracleithral and cleithral spines—Moderately strong, thin, sharp.
Lower margin of suborbital bone—Two small, triangular spines or lobes present.
Lower posterior edge of gill cover—Small spines usually present.
Symphyseal knob—A small, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A small patch is present.
End of maxillary—Under mid-orbit or rear pupil.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With some scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus or beyond; tips of ventrals sometimes to anus.
Second anal fin spine—Strongly curved, at least twice as thick as third. Tip of second extends beyond tip of third by about one-third orbit width, reaching to tips of anal rays, occasionally slightly less or more.
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Truncate, or slightly indented.
Terminal profile of anal fin—Nearly vertical.

Sebastodes rhodochloris (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.7	--- ---	--- ---
Depth of body at origin of ventral fins	3.1 – 3.5	1.2 – 1.3	2.2 – 2.7
Depth of body at origin of anal fin	4.2 – 4.6	1.4 – 1.7	1.6 – 1.9
Length of base of anal fin	6.8 – 7.8	2.5 – 3.1	1.0 – 1.2
Length of snout	10.0 –11.7	3.9 – 4.5	0.7 – 0.8
Width of orbit	7.4 – 8.7	3.0 – 3.8	--- ---
Width of interorbital space	--- ---	5.5 – 6.1	0.5 – 0.6
Width of suborbital bone	--- ---	--- ---	0.1
Length of upper jaw	5.4 – 6.1	2.1 – 2.3	1.3 – 1.5
Amount that lower jaw projects	--- ---	--- ---	0.1 – 0.2
Thickness of body	--- ---	--- ---	1.1 – 1.4
Width of base of pectoral fin	--- ---	--- ---	0.6 – 0.8
Longest pectoral fin ray	3.3 – 3.7	1.3 – 1.4	2.1 – 2.4
Longest ventral fin ray	--- ---	1.9 – 2.1	1.5 – 1.7
Length of ventral fin spine	--- ---	2.4 – 2.8	1.2 – 1.3
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	4.4 – 5.0	1.7 – 1.9	1.5 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.1 – 1.3
Longest anal fin ray	5.4 – 6.5	2.2 – 2.5	1.3 – 1.5
Longest dorsal fin spine	6.4 – 7.6	2.6 – 3.0	1.1 – 1.2
Longest dorsal fin ray	6.5 – 8.1	2.5 – 3.1	1.1
Least depth of caudal peduncle	11.3 –12.3	4.3 – 4.8	0.6 – 0.8
Ventral length of caudal peduncle	--- ---	1.8 – 1.9	1.6 – 1.8
Dorsal length of caudal peduncle	--- ---	2.5 – 2.7	1.2 – 1.3
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.4 – 0.5

Number of rays in dorsal fin	12 or 13
Number of rays in anal fin	6 (occas. 5)
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	7 or 8
Number of rakers on first gill arch	35–38
Number of pores in lateral line	35–42
Diagonal rows of scales below lateral line	44–52

Number of specimens examined	11, plus 8
Size of specimens examined	7.2 – 9.0 inches

OTHER COMMON NAMES

Flyfish

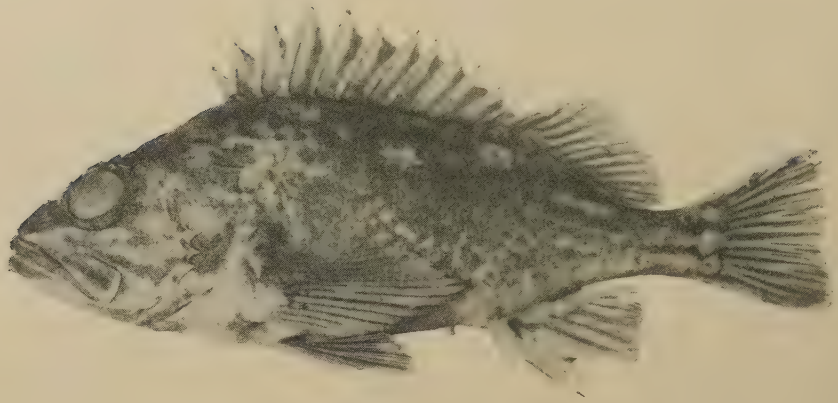

FIGURE 47

ROSY ROCKFISH

Sebastodes rosaceus Jordan & Gilbert 1882

Range—Turtle Bay, Baja California to Puget Sound.
Greatest depth taken and maximum size—70 fathoms; 12 inches.
Body color—Dark red, with yellow wash on lower sides; four or five clear, whitish blotches, bordered with purple-red, on upper part of body; fins pink, with some yellow.
Mouth and gill cavities—Pink and white, often with some yellow; light dusky stippling in gill cavity.
Peritoneum—Usually gray with black dots, but sometimes almost black.
Top of head, at mid-orbits—Strongly concave, with median groove and low frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, strong and sharp. *Coronal and nuchal spines absent*, except a nuchal sometimes present.
Parietal ridges—Moderately strong, thin.
The five preopercular spines—Moderately strong and sharp; usually radially-directed but occasionally the upper two are directed backward.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Both moderately strong.
Lower margin of suborbital bone—Usually with a small projection anteriorly, a rather triangular spine posteriorly; occasionally with two rather triangular spines.
Lower posterior edge of gill cover—Spines usually present.
Symphyseal knob—A moderately strong, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—A slight elevation may be present, but not a definitely raised patch.
End of maxillary—Usually under rear of pupil.
Maxillaries—Usually with some scales.
Mandibles—Without scales.
Branchiostegals—Usually without scales; occasionally a few may be present.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus or to anal fin.
Second anal fin spine—Usually twice as thick as third. Tip of second extends beyond tip of third by about one-fifth of orbit width, but fails to reach tips of anal fin rays by about one-third orbit width (spines and fin depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Vertical or with a slight anterior slant.

Sebastodes rosaceus Jordan & Gilbert 1882

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.7 – 3.0	1.1 – 1.2	3.0 – 3.5
Depth of body at origin of anal fin	3.6 – 3.8	1.4 – 1.6	2.3 – 2.9
Length of base of anal fin	6.4 – 7.2	2.6 – 2.9	1.2 – 1.5
Length of snout	8.7 – 9.7	3.5 – 4.0	0.9 – 1.2
Width of orbit	8.5 – 9.9	3.5 – 4.0	--- ---
Width of interorbital space	--- ---	6.5 – 7.4	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.2 – 0.3
Length of upper jaw	5.0 – 5.2	2.0 – 2.1	1.7 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	1.6 – 1.9
Width of base of pectoral fin	--- ---	--- ---	0.8 – 1.1
Longest pectoral fin ray	3.3 – 3.8	1.3 – 1.5	2.5 – 2.9
Longest ventral fin ray	--- ---	1.8 – 2.1	1.8 – 2.1
Length of ventral fin spine	--- ---	2.6 – 3.0	1.3 – 1.4
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	4.5 – 5.5	1.8 – 2.3	1.7 – 2.0
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.5
Longest anal fin ray	4.9 – 5.5	2.0 – 2.2	1.7 – 2.0
Longest dorsal fin spine	5.6 – 6.5	2.3 – 2.6	1.4 – 1.6
Longest dorsal fin ray	5.9 – 6.8	2.4 – 2.8	1.4 – 1.5
Least depth of caudal peduncle	9.9 –10.9	4.0 – 4.5	0.8 – 1.0
Ventral length of caudal peduncle	--- ---	2.0 – 2.2	1.6 – 1.9
Dorsal length of caudal peduncle	--- ---	3.0 – 3.4	1.1 – 1.3
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.6

Number of rays in dorsal fin	13 (occas. 12)
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 (occas. 7 or 9)
Number of rakers on first gill arch	30–33
Number of pores in lateral line	36–42
Diagonal rows of scales below lateral line	41–48
Number of specimens examined	8, plus 7
Size of specimens examined	7.0–11.2 inches

OTHER COMMON NAMES

Corsair, dude, scacciatale, scratch-tail

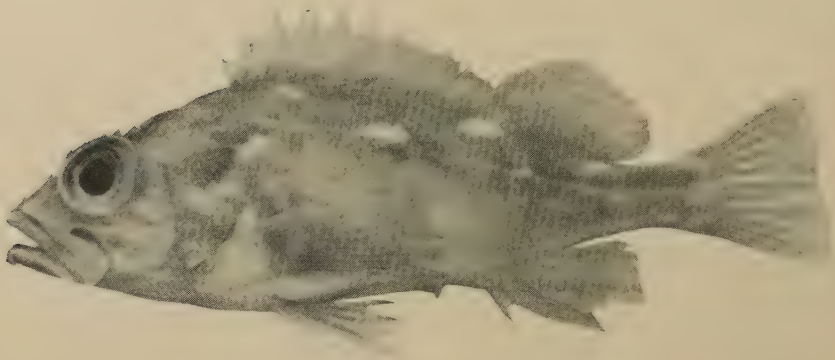

FIGURE 48

ROSETHORN ROCKFISH

Sebastodes helvomaculatus (Ayres 1859)

Range—Guadalupe Island, Baja California to Monterey, California.
Greatest depth taken and maximum size—250 fathoms; 13 inches.
Body color—Orange-yellow, with light oliveaceous mottling on back; four or five clear, white blotches, bordered with light pink or orange, on upper part of body; a dusky area on opercle; fins pink, with some yellow-green.
Mouth and gill cavities—Pink and white, often with some yellow; a dark splotch on underside of opercle.
Peritoneum—Gray with black dots, or black.
Top of head, at mid-orbits—Strongly concave, with median groove and low frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, very strong and sharp. *Coronal and nuchal spines absent*, except that occasionally a nuchal spine is present.
Parietal ridges—Strong, high and thin.
The five preopercular spines—Moderately strong and sharp; usually radially-directed but occasionally the upper two are directed backward.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Usually with a small projection anteriorly, a rather triangular spine posteriorly; occasionally with two rather triangular spines.
Lower posterior edge of gill cover—Spines present or absent.
Symphyseal knob—A moderately strong, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—A slight elevation may be present, but not a definitely raised patch.
End of maxillary—Under mid-orbit or rear of pupil.
Maxillaries—Usually with some scales.
Mandibles—Usually without scales, but occasionally with a patch.
Branchiostegals—Usually without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus or to anal fin.
Second anal fin spine—Usually twice as thick as third. Tip of second extends beyond tip of third by about one-fifth of orbit width, but fails to reach tips of anal fin rays by about one-third of orbit width (spines and fin depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Nearly vertical, or with a slight anterior slant.

Sebastodes helvomaculatus (Ayres 1859)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.5	---	---
Depth of body at origin of ventral fins	2.8 – 3.1	1.2 – 1.3	2.6 – 2.9
Depth of body at origin of anal fin	4.0 – 4.1	1.6 – 1.7	1.7 – 2.2
Length of base of anal fin	6.7 – 7.4	2.8 – 3.1	1.1 – 1.3
Length of snout	9.4 –10.2	3.9 – 4.2	0.8 – 0.9
Width of orbit	7.6 – 9.0	3.0 – 3.6	---
Width of interorbital space	---	7.0 – 8.1	0.4 – 0.5
Width of suborbital bone	---	---	0.1 – 0.2
Length of upper jaw	5.0 – 5.3	2.1 – 2.2	1.5 – 1.7
Amount that lower jaw projects	---	---	0.0 – 0.1
Thickness of body	---	---	1.4 – 1.6
Width of base of pectoral fin	---	---	0.7 – 0.8
Longest pectoral fin ray	3.3 – 3.8	1.3 – 1.5	2.2 – 2.5
Longest ventral fin ray	---	2.0 – 2.1	1.5 – 1.8
Length of ventral fin spine	---	2.8 – 3.0	1.0 – 1.2
Length of first anal fin spine	---	---	0.6 – 0.8
Length of second anal fin spine	4.9 – 5.6	2.0 – 2.3	1.4 – 1.7
Length of third anal fin spine	---	---	1.1 – 1.3
Longest anal fin ray	5.0 – 5.6	2.1 – 2.3	1.4 – 1.6
Longest dorsal fin spine	6.5 – 8.2	2.6 – 3.3	1.1 – 1.3
Longest dorsal fin ray	6.2 – 6.8	2.5 – 2.8	1.1 – 1.4
Least depth of caudal peduncle	10.8 –12.2	4.6 – 5.0	0.6 – 0.8
Ventral length of caudal peduncle	---	2.0 – 2.4	1.4 – 1.8
Dorsal length of caudal peduncle	---	3.0 – 3.5	1.0 – 1.2
Posterior of anus to origin of anal fin	---	---	0.4 – 0.5
Longest raker on first gill arch	---	---	0.2 – 0.3

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6 (occas. 7)
Number of rays in each pectoral fin	16 or 17 (occas. 15)
Unbranched rays in each pectoral fin	7 or 8 (occas. 6)
Number of rakers on first gill arch	28–33
Number of pores in lateral line	35–41
Diagonal rows of scales below lateral line	42–48

Number of specimens examined	8, plus 10
Size of specimens examined	8.5–12.5 inches

OTHER COMMON NAMES

Deep-water seacciatale, deep-water scratch-tail

FIGURE 49

GREENSPOTTED ROCKFISH

Sebastodes chlorostictus (Jordan & Gilbert 1880)

Range—Cedros Island, Baja California to San Francisco, California.
Greatest depth taken and maximum size—150 fathoms; 15 inches.
Body color—Yellow-pink, with irregular, green spots and streaks on back and upper sides; three to five whitish blotches on back; fins yellow-pink.
Mouth and gill cavities—Pink, white and yellow.
Peritoneum—Gray with black dots, or black.
Top of head, at mid-orbits—Deeply concave, with a median groove bordered by low frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, strong and sharp. *Coronal and nuchal spines absent.*
Parietal ridges—High and thin.
The five preopercular spines—Strong and sharp, radially directed, or with the upper two longer and directed backward.
The two opercular spines—Strong and sharp.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Two triangular spines present, the rearmost sometimes multifid.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A strong, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—A slight elevation may be present, but not a definitely raised patch.
End of maxillary—Under mid-orbit to rear of orbit.
Maxillaries—Scales present.
Mandibles—Without scales.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus or beyond.
Second anal fin spine—Two to three times as thick as third. Tip of second usually extends to or a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Slightly convex, or with a slightly anterior slant.

Sebastodes chlorostictus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.3 – 2.6	---	---
Depth of body at origin of ventral fins	2.6 – 2.9	1.1 – 1.2	3.0 – 3.6
Depth of body at origin of anal fin	3.5 – 4.0	1.4 – 1.7	2.3 – 2.7
Length of base of anal fin	6.5 – 7.9	2.6 – 3.3	1.2 – 1.4
Length of snout	9.0 – 9.9	3.7 – 4.1	0.9 – 1.0
Width of orbit	8.7 – 9.8	3.4 – 4.1	---
Width of interorbital space	---	5.9 – 7.0	0.6 – 0.7
Width of suborbital bone	---	---	0.2 – 0.3
Length of upper jaw	4.7 – 5.3	2.0 – 2.1	1.7 – 1.9
Amount that lower jaw projects	---	---	0.0 – 0.2
Thickness of body	---	---	1.6 – 1.8
Width of base of pectoral fin	---	---	0.8 – 1.0
Longest pectoral fin ray	3.4 – 3.9	1.3 – 1.6	2.2 – 2.9
Longest ventral fin ray	---	1.8 – 2.1	1.9 – 2.1
Length of ventral fin spine	---	2.6 – 2.8	1.4
Length of first anal fin spine	---	---	0.6 – 1.0
Length of second anal fin spine	5.0 – 5.9	2.1 – 2.4	1.6 – 1.9
Length of third anal fin spine	---	---	1.2 – 1.5
Longest anal fin ray	4.9 – 5.4	2.1 – 2.3	1.3 – 1.9
Longest dorsal fin spine	4.6 – 5.9	2.0 – 2.4	1.7 – 2.0
Longest dorsal fin ray	5.8 – 6.4	2.5 – 2.7	1.5 – 1.6
Least depth of caudal peduncle	9.7 –11.2	4.0 – 4.7	0.8 – 1.0
Ventral length of caudal peduncle	---	2.0 – 2.3	1.7 – 1.9
Dorsal length of caudal peduncle	---	3.0 – 3.2	1.2 – 1.3
Posterior of anus to origin of anal fin	---	---	0.3 – 0.5
Longest raker on first gill arch	---	---	0.4 – 0.5

Number of rays in dorsal fin	12 or 13
Number of rays in anal fin	6 (occas. 5)
Number of rays in each pectoral fin	17 (occas. 16)
Unbranched rays in each pectoral fin	8 (occas. 7 or 9)
Number of rakers on first gill arch	31–34
Number of pores in lateral line	35–40
Diagonal rows of scales below lateral line	43–48

Number of specimens examined	9, plus 2
Size of specimens examined	6.0 – 13.7 inches

OTHER COMMON NAMES

Chucklehead, Santa Maria

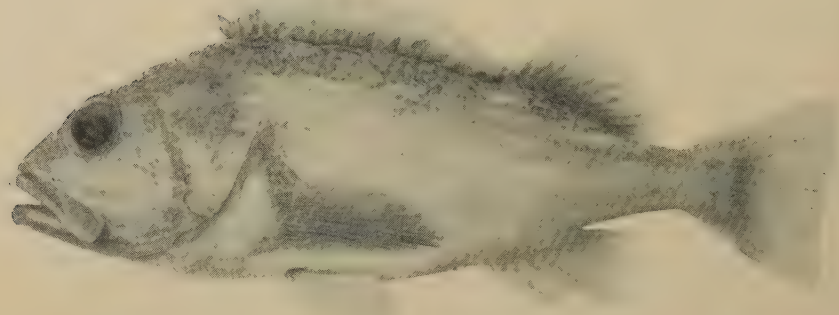

FIGURE 50

PINK ROCKFISH

Sebastodes eos (Eigenmann & Eigenmann 1890)

Range—Guadalupe Island, Baja California to San Francisco, California.
Greatest depth taken and maximum size—150 fathoms; 22 inches.
Body color—Faded pink, with vague green streaks and small blotches on back; three to five whitish blotches on back; fins yellow-pink.
Mouth and gill cavities—Pink, white and yellow.
Peritoneum—White, or gray with black dots.
Top of head, at mid-orbits—Moderately to deeply concave, with a median groove bordered by low frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietals, and occasionally nuchals, present; rarely, a coronal spine may be present. *Coronal and nuchal spines usually absent.*
Parietal ridges—High and thin.
The five preopercular spines—Strong and sharp, radially directed, or with the upper two longer and directed backward.
The two opercular spines—Strong and sharp.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Two sharply triangular spines present, the posterior one sometimes multifid.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A strong, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—A slight elevation may be present, but not a definitely raised patch.
End of maxillary—Under mid-orbit to rear of orbit.
Maxillaries—Covered with scales.
Mandibles—Fairly well covered with fine scales or only a patch or two.
Branchiostegals—Usually with some scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus or beyond.
Second anal fin spine—Two to three times as thick as third. Tip of second usually extends to or a little beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Deeply incised.
Posterior profile of caudal fin—Slightly to moderately indented.
Terminal profile of anal fin—Slightly convex, or with a slight anterior slant.

Sebastodes eos (Eigenmann & Eigenmann 1890)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.2 - 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.6 - 3.0	1.1 - 1.3	2.6 - 3.8
Depth of body at origin of anal fin	3.7 - 4.3	1.5 - 1.8	1.8 - 2.6
Length of base of anal fin	6.9 - 8.0	2.8 - 3.4	1.1 - 1.5
Length of snout	8.2 - 9.6	3.6 - 4.0	0.8 - 1.2
Width of orbit	7.8 -10.4	3.2 - 4.5	--- ---
Width of interorbital space	--- ---	5.1 - 6.8	0.5 - 0.8
Width of suborbital bone	--- ---	--- ---	0.2 - 0.4
Length of upper jaw	4.8 - 5.3	2.0 - 2.2	1.5 - 2.1
Amount that lower jaw projects	--- ---	--- ---	0.0 - 0.2
Thickness of body	--- ---	--- ---	1.4 - 2.1
Width of base of pectoral fin	--- ---	--- ---	0.7 - 1.1
Longest pectoral fin ray	3.4 - 3.9	1.4 - 1.7	2.1 - 2.9
Longest ventral fin ray	-- ---	1.9 - 2.4	1.5 - 2.1
Length of ventral fin spine	--- ---	2.6 - 4.1	1.1 - 1.3
Length of first anal fin spine	--- ---	--- ---	0.6 - 0.9
Length of second anal fin spine	4.9 - 7.5	2.0 - 3.2	1.3 - 1.8
Length of third anal fin spine	--- ---	--- ---	1.1 - 1.3
Longest anal fin ray	4.8 - 6.4	2.0 - 2.7	1.6 - 1.8
Longest dorsal fin spine	4.8 - 6.4	2.0 - 2.9	1.4 - 1.9
Longest dorsal fin ray	6.2 - 7.3	2.6 - 3.1	1.3 - 1.5
Least depth of caudal peduncle	10.3 -12.4	4.2 - 5.3	0.7 - 0.9
Ventral length of caudal peduncle	--- ---	2.0 - 2.5	1.5 - 2.1
Dorsal length of caudal peduncle	--- ---	2.8 - 3.3	1.1 - 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 - 0.6
Longest raker on first gill arch	-- ---	--- ---	0.2 - 0.4

Number of rays in dorsal fin	12 or 13
Number of rays in anal fin	6 (occas. 7)
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 (occas. 7 or 9)
Number of rakers on first gill arch	28–33
Number of pores in lateral line	34–40
Diagonal rows of scales below lateral line	41–48

Number of specimens examined	15
Size of specimens examined	6.2 - 17.5 inches

OTHER COMMON NAMES

Chucklehead, dawn rockfish, Santa Maria

FIGURE 51

STARRY ROCKFISH

Sebastodes constellatus (Jordan & Gilbert 1880)

Range—Cedros Island, Baja California to San Francisco, California.
Greatest depth taken and maximum size—90 fathoms; 18 inches.
Body color—Orange-red shading into yellowish on lower sides; body profusely covered with small, white to pink-white dots; three to five clear, whitish blotches on back. Large specimens may become dusky on back.
Mouth and gill cavities—Pink, white and yellow.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Strongly concave; the groove at bottom of concavity with a low, frontal ridge on either side.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic and parietals present, strong. *Coronal and nuchal spines absent.*
Parietal ridges—Moderately high and thin.
The five preopercular spines—Usually the upper two are longer and directed backward, the lower three radially-directed.
The two opercular spines—Moderately strong.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Spines absent, or with one, triangular projection.
Lower posterior edge of gill cover—Spines present or absent.
Symphyseal knob—A low but prominent, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—Slightly to moderately raised.
End of maxillary—Under rear of pupil, to rear of orbit.
Maxillaries—Scales present.
Mandibles—Without scales, or with a patch or two.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus or beyond. Tips of ventrals reach anus.
Second anal fin spine—Twice as thick as third. Tip of second extends slightly beyond tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly indented.
Terminal profile of anal fin—Truncate, or slightly convex (rounded).

Sebastodes constellatus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4	--- ---	--- ---
Depth of body at origin of ventral fins	2.9 – 3.2	1.2 – 1.3	2.8 – 3.6
Depth of body at origin of anal fin	3.9 – 4.1	1.6 – 1.7	2.1 – 2.7
Length of base of anal fin	7.1 – 7.6	2.9 – 3.2	1.3 – 1.5
Length of snout	8.6 – 9.4	3.6 – 3.9	1.0 – 1.2
Width of orbit	9.4 –10.7	4.0 – 4.4	--- ---
Width of interorbital space	--- ---	7.5 – 9.0	0.4 – 0.6
Width of suborbital bone	--- ---	--- ---	0.2 0.3
Length of upper jaw	4.7 – 5.1	2.0 – 2.1	1.9 – 2.1
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- ---	--- ---	1.5 1.9
Width of base of pectoral fin	--- ---	--- ---	0.9 1.0
Longest pectoral fin ray	3.5 – 3.8	1.4 – 1.6	2.6 – 2.9
Longest ventral fin ray	--- ---	2.1 – 2.2	1.9
Length of ventral fin spine	--- ---	2.7 – 3.1	1.4 – 1.5
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	5.0 – 6.0	2.1 – 2.5	1.7 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.3 – 1.4
Longest anal fin ray	5.3 – 6.1	2.3 – 2.5	1.7 – 1.8
Longest dorsal fin spine	6.6 – 7.4	2.8 – 3.1	1.4 – 1.5
Longest dorsal fin ray	7.0 – 7.8	2.9 – 3.2	1.3 – 1.5
Least depth of caudal peduncle	10.7 –11.6	4.5 – 4.9	0.8 – 1.0
Ventral length of caudal peduncle	--- ---	2.2 – 2.4	1.7 – 2.0
Dorsal length of caudal peduncle	--- ---	3.2 – 3.5	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.5 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	12–14
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 (occas. 16)
Unbranched rays in each pectoral fin	8 (occas. 7)
Number of rakers on first gill arch	27–30
Number of pores in lateral line	37–43
Diagonal rows of scales below lateral line	45–50

Number of specimens examined	5, plus 12
Size of specimens examined	6.5 – 10.5 inches

OTHER COMMON NAMES

Spotted rockfish, chinafish

FIGURE 52

CHINA ROCKFISH

Sebastodes nebulosus (Ayres 1854)

Range—Point Buchon, California to S. E. Alaska.
Greatest depth taken and maximum size—70 fathoms; 16 inches.
Body color—Blue-black mottled with yellow; a broad, irregular yellow stripe starts on spinous dorsal fin, between third and fourth spines, and extends diagonally downward to lateral line, thence along lateral line to base of tail; whitish or bluish-white spotting and blotching on body. Fins, dark.
Mouth and gill cavities—Mainly white, occasionally with patches of yellow; usually a dark blotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, over mid-orbits—Strongly concave, with bottom of concavity slightly convex.
Spines on top of head— Nasal, preocular, postocular, tympanic and parietals present, thick and high, encased in thick skin. *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—High and thick.
The five preopercular spines—Short and thick, rather radially-directed; an occasional spine is bifid; lowermost two are often reduced.
The two opercular spines—Short and triangular.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Two rounded, or somewhat triangular projections present.
Lower posterior edge of gill cover—Small spines usually present.
Symphyseal knob—A low, downward-projecting knob may be present, or absent.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under mid-orbit, to rear of orbit.
Maxillaries—Without scales.
Mandibles—Without scales, or with some fine, imbedded scales.
Branchiostegals—Usually without scales, but occasionally with a few.
End of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, usually reaching anus or slightly beyond.
Second anal fin spine—About twice as thick as third. Tip of second reaches about to tip of third, or slightly beyond (spines depressed).
Spinous dorsal fin membrane—Moderately to deeply incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes nebulosus (Ayres 1854)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.4 – 2.6	1.0 – 1.1	3.6 – 4.4
Depth of body at origin of anal fin	3.6 – 3.8	1.4 – 1.6	2.6 – 3.0
Length of base of anal fin	6.1 – 6.5	2.5 – 2.6	1.4 – 1.8
Length of snout	9.5 – 9.8	3.9 – 4.0	0.9 – 1.2
Width of orbit	9.2 –11.6	3.7 – 4.7	--- ---
Width of interorbital space	--- ---	6.4 – 7.7	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.2 – 0.4
Length of upper jaw	5.1 – 5.2	1.9 – 2.1	1.9 – 2.3
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	1.9 – 2.5
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.6
Longest pectoral fin ray	3.2 – 4.3	1.3 – 1.8	2.3 – 3.4
Longest ventral fin ray	--- ---	1.7 – 1.9	2.1 – 2.6
Length of ventral fin spine	--- ---	2.5 – 3.3	1.3 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.8
Length of second anal fin spine	5.5 – 8.2	2.2 – 3.3	1.4 – 1.7
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.4
Longest anal fin ray	4.5 – 5.7	1.8 – 2.3	1.9 – 2.1
Longest dorsal fin spine	4.7 – 5.3	1.9 – 2.1	1.6 – 2.0
Longest dorsal fin ray	5.5 – 6.1	2.2 – 2.5	1.5 – 2.0
Least depth of caudal peduncle	9.2 – 9.6	3.7 – 3.9	0.9 – 1.2
Ventral length of caudal peduncle	--- ---	2.2 – 2.5	1.5 – 1.9
Dorsal length of caudal peduncle	--- ---	3.3 – 3.6	1.0 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.4
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	13
Number of rays in anal fin	7 (occas. 6)
Number of rays in each pectoral fin	18 (occas. 17 or 19)
Unbranched rays in each pectoral fin	10 (occas. 9 or 11)
Number of rakers on first gill arch	28–31
Number of pores in lateral line	38–41
Diagonal rows of scales below lateral line	43–48

Number of specimens examined	3, plus 5
Size of specimens examined	10.7 – 16.0 inches

OTHER COMMON NAMES

Yellow-striped rockfish, pelican, yellow-spotted rockfish, cerod, black-and-yellow rockfish, cefalutano, yellow rockfish

FIGURE 53

GOPHER ROCKFISH

Sebastodes carnatus (Jordan & Gilbert 1880)

Range—San Roque, Baja California to Eureka, California.
Greatest depth taken and maximum size—30 fathoms; 15 inches.
Body color—Olive-brown, with a number of constantly-placed clear, light-gray or pink blotches on back, lateral line and on lower sides. The clear areas tend to run together on lower sides. (This species similar to *S. chrysomelas*.)
Mouth and gill cavities—Mainly white, sometimes with some light yellow or light dusky areas; a dark splotch on underside of opercle.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Rather strongly concave, but with median portion slightly convex.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong; occasionally the tympanics are absent. *Supraocular, coronal and nuchal spines always absent.*
Parietal ridges—Thick and high.
The five preopercular spines—Short and heavy, and any may be bifid. Radially-directed, but occasionally the upper two are directed backward.
The two opercular spines—moderately strong, heavy.
Supracleithral and cleithral spines—Moderately strong.
Lower margin of suborbital bone—Spines absent, but two rounded projections usually present.
Lower posterior edge of gill cover—Spines present, or absent.
Symphyseal knob—A slight knob may be present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Without scales (the skin is thick and pebbly).
Mandibles—Without scales (the skin is thick and pebbly).
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or beyond, reaching anus, or slightly beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second may reach tip of third, or only a little less (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes carnatus (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.3 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	2.5 – 2.7	1.0 – 1.1	3.3 – 4.4
Depth of body at origin of anal fin	3.0 – 3.8	1.2 – 1.6	2.4 – 3.5
Length of base of anal fin	5.8 – 6.9	2.3 – 2.9	1.4 – 1.9
Length of snout	9.2 –10.7	3.6 – 4.3	0.9 – 1.2
Width of orbit	9.0 –11.0	3.7 – 4.5	--- ---
Width of interorbital space	--- ---	7.1 – 8.1	0.5 – 0.6
Width of suborbital bone	--- ---	--- ---	0.3
Length of upper jaw	4.9 – 5.1	2.0 – 2.1	1.8 – 2.2
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- ---	--- ---	1.8 – 2.5
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.3
Longest pectoral fin ray	3.2 – 3.5	1.3 – 1.4	2.8 – 3.4
Longest ventral fin ray	--- ---	1.6 – 2.2	1.7 – 2.6
Length of ventral fin spine	--- ---	2.6 – 3.1	1.4 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.8 – 0.9
Length of second anal fin spine	5.6 – 7.1	2.2 – 2.9	1.6 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.2 – 1.7
Longest anal fin ray	4.5 – 5.4	1.8 – 2.2	1.8 – 2.4
Longest dorsal fin spine	4.7 – 5.9	2.0 – 2.4	1.6 – 2.1
Longest dorsal fin ray	5.2 – 6.0	2.1 – 2.5	1.6 – 2.1
Least depth of caudal peduncle	8.3 – 9.2	3.3 – 3.9	1.1 – 1.3
Ventral length of caudal peduncle	--- ---	2.1 – 2.6	1.5 – 2.2
Dorsal length of caudal peduncle	--- ---	3.2 – 3.6	1.1 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.4 0.7
Longest raker on first gill arch	--- ---	--- ---	0.2 0.4

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 (occas. 16 or 18)
Unbranched rays in each pectoral fin	8 or 9 (occas. 7)
Number of rakers on first gill arch	27–30
Number of pores in lateral line	36–42
Diagonal rows of scales below lateral line	37–43

Number of specimens examined	10, plus 10
Size of specimens examined	6.2 – 9.7 inches

OTHER COMMON NAMES

Flesh-colored rockfish

FIGURE 54

BLACK-AND-YELLOW ROCKFISH

Sebastodes chrysomelas (Jordan & Gilbert 1880)

Range—Ensenada, Baja California to Eureka, California.
Greatest depth taken and maximum size—20 fathoms; 15 inches.
Body color—Black, with a number of constantly-placed clear yellow blotches on back, lateral line and lower sides. The clear areas tend to run together on lower sides. (This species is similar to *S. carnatus.*)
Mouth and gill cavities—Mainly white, sometimes with some light yellow or light dusky areas; a dark splotch on underside of opercle.
Peritoneum—Silver white.
Top of head, at mid-orbits—Rather strongly concave, but with median portion slightly convex.
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, strong, except that occasionally the tympanics are absent. *Supraocular, coronal and nuchal spines always absent.*
Parietal ridges—Thick and high.
The five preopercular spines—Short and heavy, and any may be bifid. Radially-directed, but occasionally the upper two are directed backward.
The two opercular spines—Moderately strong, heavy.
Supracleithral and cleithral spines—Moderately strong.
Lower margin of suborbital bone—Spines absent, but two rounded projections usually are present.
Lower posterior edge of gill cover—Spines present, or absent.
Symphyseal knob—A slight knob may be present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil or rear of orbit.
Maxillaries—Without scales (the skin is thick and pebbly).
Mandibles—Without scales (the skin is thick and pebbly).
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or beyond, reaching anus, or slightly beyond.
Second anal fin spine—Usually twice as thick as third. Tip of second may reach tip of third, or only a little less (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes chrysomelas (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.3 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.5 – 2.7	1.0 – 1.1	3.5 – 4.6
Depth of body at origin of anal fin	3.0 – 3.6	1.2 – 1.5	2.7 – 3.7
Length of base of anal fin	5.6 – 6.9	2.3 – 2.8	1.5 – 2.0
Length of snout	9.4 –10.3	3.6 – 4.4	0.9 – 1.2
Width of orbit	9.0 –11.3	3.8 – 4.6	--- ---
Width of interorbital space	--- ---	6.2 – 7.6	0.5 – 0.8
Width of suborbital bone	--- ---	--- ---	0.2 – 0.4
Length of upper jaw	4.7 – 5.4	2.0 – 2.1	1.8 – 2.0
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- ---	--- ---	1.8 – 2.3
Width of base of pectoral fin	--- ---	--- ---	1.1 – 1.3
Longest pectoral fin ray	2.9 – 3.4	1.2 – 1.4	2.9 – 3.5
Longest ventral fin ray	--- ---	1.8 – 1.9	1.5 – 2.5
Length of ventral fin spine	--- ---	2.4 – 2.9	1.4 – 2.0
Length of first anal fin spine	--- ---	--- ---	0.7 – 0.9
Length of second anal fin spine	5.3 – 6.6	2.1 – 2.6	1.6 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.3 – 1.7
Longest anal fin ray	4.7 – 5.6	1.9 – 2.2	1.9 – 2.3
Longest dorsal fin spine	4.5 – 6.2	1.9 – 2.5	1.6 – 2.2
Longest dorsal fin ray	5.3 – 6.1	2.2 – 2.4	1.6 – 2.0
Least depth of caudal peduncle	8.0 – 8.9	3.2 – 3.6	1.1 – 1.4
Ventral length of caudal peduncle	--- ---	2.2 – 2.3	1.7 – 1.9
Dorsal length of caudal peduncle	--- ---	3.5 – 3.9	1.0 – 1.1
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.6
Longest raker on first gill arch	--- ---	--- ---	0.3 – 0.4

Number of rays in dorsal fin	13 (occas. 12 or 14)
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 (occas. 18)
Unbranched rays in each pectoral fin	8 or 9 (occas. 10)
Number of rakers on first gill arch	27–30
Number of pores in lateral line	35–40
Diagonal rows of scales below lateral line	40–46

Number of specimens examined	9, plus 6
Size of specimens examined	5.0 – 10.0 inches

OTHER COMMON NAMES

Gopher rockfish

FIGURE 55

TREEFISH

Sebastodes serriceps (Jordan & Gilbert 1880)

Range—Cedros Island, Baja California to San Francisco, California.
Greatest depth taken and maximum size—25 fathoms; 16 inches.
Body color—Dark olive above, yellowish below; sides of body with five distinct, vertical, black bars, a sixth bar across caudal peduncle; two narrow, diagonal, black bars on side of head; lips tinged with pink, fins dark.
Mouth and gill cavities—White in young; dusky-white tinged with pink, and a dark blotch on underside of opercle, in adults.
Peritoneum—Silvery white.
Top of head, at mid-orbits—Strongly concave below tops of ocular ridges, but the median portion is flat or slightly convex.
Spines on top of head—Nasal, preocular, postocular, tympanic, parietal and nuchals present, except that occasionally a nuchal may be absent. Spines strong and have skin to tips. *Supraocular and coronals absent.*
Parietal ridges—Strong, high and smooth on top.
The five preopercular spines—Coarse, the upper two or three stronger and longer than the others; occasionally bifid.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Strong; occasionally the cleithral is double.
Lower margin of suborbital bone—Absent, but two blunt projections present.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—Absent, or only a slight knob present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under mid-orbit in young; under rear of pupil in adults.
Maxillaries—Without scales (the skin is slack and thick).
Mandibles—Without scales (the skin is slack and thick).
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals reach tips of ventrals or a little beyond, usually reaching anus.
Second anal fin spine—Twice as thick as third. Tip of second nearly to tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes serriceps (Jordan & Gilbert 1880)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.4 – 2.8	1.0 – 1.1	3.5 – 5.1
Depth of body at origin of anal fin	3.0 – 3.7	1.2 – 1.4	2.5 – 4.0
Length of base of anal fin	6.7 – 7.5	2.6 – 2.9	1.4 – 1.8
Length of snout	8.5 – 9.5	3.4 – 3.7	1.0 – 1.5
Width of orbit	9.3 –12.4	3.6 – 5.0	--- ---
Width of interorbital space	--- ---	6.7 – 9.4	0.4 – 0.7
Width of suborbital bone	--- ---	--- ---	0.2 – 0.4
Length of upper jaw	5.2 – 5.6	2.1	1.7 – 2.4
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	1.6 – 2.4
Width of base of pectoral fin	--- ---	--- ---	1.0 – 1.4
Longest pectoral fin ray	3.3 – 3.8	1.3 – 1.5	2.8 – 3.5
Longest ventral fin ray	--- ---	1.6 – 1.8	2.5 – 2.8
Length of ventral fin spine	--- ---	2.6 – 3.1	1.5 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.9 – 1.0
Length of second anal fin spine	4.9 – 6.4	1.9 – 2.6	1.9 – 2.0
Length of third anal fin spine	--- ---	--- ---	1.5 – 1.9
Longest anal fin ray	4.2 – 5.1	1.7 – 2.0	1.9 – 2.7
Longest dorsal fin spine	5.6 – 6.7	2.2 – 2.7	1.7 – 2.1
Longest dorsal fin ray	5.2 – 6.4	2.0 – 2.5	1.7 – 2.2
Least depth of caudal peduncle	8.5 –10.7	3.3 – 4.0	0.9 – 1.4
Ventral length of caudal peduncle	--- ---	1.7 – 2.3	1.7 – 2.4
Dorsal length of caudal peduncle	--- ---	3.0 – 3.5	1.1 – 1.5
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	13 or 14 (occas. 15)
Number of rays in anal fin	6
Number of rays in each pectoral fin	17 or 18
Unbranched rays in each pectoral fin	8–10 (occas. 7)
Number of rakers on first gill arch	27–29
Number of pores in lateral line	46–50
Diagonal rows of scales below lateral line	51–63

Number of specimens examined	6, plus 3
Size of specimens examined	6.0–15.5 inches

OTHER COMMON NAMES

Convictfish, barberpole

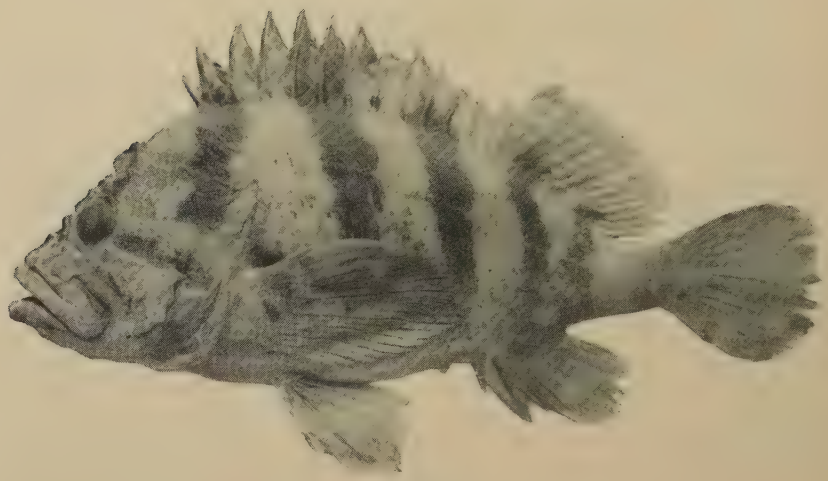

FIGURE 56

TIGER ROCKFISH
Sebastodes nigrocinctus (Ayres 1859)

Range—Point Buchon, California to SE. Alaska.
Greatest depth taken and maximum size—150 fathoms; 24 inches.
Body color—Light red with several broad, vertical, black-red bars on body. In young specimens the tips of the ventral and anal fins are blackened.
Mouth and gill cavities—Pink.
Peritoneum—White.
Top of head, at mid-orbits—Deep concavities are formed between the very high ocular ridges and between the equally high frontal ridges.
Spines on top of head—Nasal, preocular, postocular, tympanic, coronal, parietal and nuchals present, thick, coarse, sometimes divided into several points. Occasionally, supraoculars are present, or a coronal or nuchal spine absent.
Parietal ridges—Very high, thick, the tops usually irregular.
The five preopercular spines—Coarse and short, may be multifid; usually radially-directed, with the upper two sometimes longest.
The two opercular spines—Long and sharp.
Supracleithral and cleithral spines—Strong, the supracleithral sometimes double.
Lower margin of suborbital bone—A small lobe anteriorly; a larger, triangular spine posteriorly.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A low, flat knob may be present or absent.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under mid-orbit to rear of orbit.
Maxillaries—Without scales.
Mandibles—Without scales.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Tips of pectorals extend to tips of ventrals or a little beyond, usually reaching anus.
Second anal fin spine—At least twice as thick as third. Tip of second reaches tip of third, or about one-fifth orbit width less.
Spinous dorsal fin membrane—Moderately to deeply incised.
Posterior profile of caudal fin—Convex (rounded).
Terminal profile of anal fin—Convex (rounded).

Sebastodes nigrocinctus (Ayres 1859)

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5 – 2.6	--- ---	--- ---
Depth of body at origin of ventral fins	2.4 – 2.6	0.9 – 1.0	4.4 – 5.0
Depth of body at origin of anal fin	3.2 – 3.4	1.3 – 1.4	3.2 – 3.7
Length of base of anal fin	6.2 – 7.2	2.4 – 2.7	1.5 – 1.8
Length of snout	8.6 –10.4	3.4 – 4.1	1.0 – 1.4
Width of orbit	10.8 –12.3	4.2 – 4.8	--- ---
Width of interorbital space	--- ---	7.0 – 8.1	0.5 – 0.7
Width of suborbital bone	--- ---	--- ---	0.3 – 0.4
Length of upper jaw	5.0 – 5.5	2.0 – 2.2	2.0 – 2.2
Amount that lower jaw projects	--- ---	--- ---	0.0 – 0.1
Thickness of body	--- ---	--- ---	1.9 – 2.4
Width of base of pectoral fin	--- ---	--- ---	1.2 – 1.5
Longest pectoral fin ray	3.3 – 3.9	1.4 – 1.5	2.8 – 3.5
Longest ventral fin ray	--- ---	1.7 – 1.8	2.3 – 2.7
Length of ventral fin spine	--- ---	2.7 – 3.0	1.4 – 1.7
Length of first anal fin spine	--- ---	--- ---	0.7 – 1.0
Length of second anal fin spine	6.0 – 7.4	2.3 – 2.8	1.5 – 1.8
Length of third anal fin spine	--- ---	--- ---	1.4 – 1.6
Longest anal fin ray	5.0 – 5.1	2.0	1.9 – 2.3
Longest dorsal fin spine	5.2 – 6.8	2.2 – 2.5	1.7 – 2.2
Longest dorsal fin ray	5.0 – 6.0	2.0 – 2.4	2.0 – 2.3
Least depth of caudal peduncle	8.9 –10.1	3.5 – 4.1	1.1 – 1.3
Ventral length of caudal peduncle	--- ---	2.2 – 2.3	1.9 – 2.1
Dorsal length of caudal peduncle	--- ---	3.5 – 3.6	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.3 – 0.5
Longest raker on first gill arch	--- ---	--- ---	0.2 – 0.3

Number of rays in dorsal fin	14 or 15 (occas. 13)
Number of rays in anal fin	7
Number of rays in each pectoral fin	19 (occas. 18 or 20)
Unbranched rays in each pectoral fin	10 (occas. 9 or 11)
Number of rakers on first gill arch	28–30
Number of pores in lateral line	43–50
Diagonal rows of scales below lateral line	44–53

Number of specimens examined	7, plus 1
Size of specimens examined	11.0–17.0 inches

OTHER COMMON NAMES

Banded rockfish, black-banded rockfish

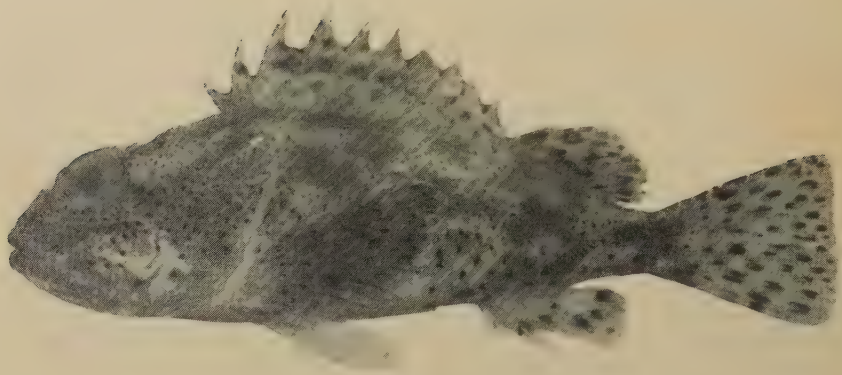

FIGURE 57

SCULPIN

Scorpaena guttata Girard 1854

Range—Pt. Abreojos, Baja California to Pt. Arguello, California.
Greatest depth taken and maximum size—25 fathoms; 17 inches.
Body color—Brick-red to brown, irregularly mottled with light-olive and brown; numerous dark spots and blotches on body, head and fins.
Mouth and gill cavities—Pink and white, sometimes with yellow-green areas.
Peritoneum—White.
Top of head, at mid-orbits—Deeply concave with a pair of low frontal ridges near median line. Posterior to orbits there is a transverse depression; immediately behind each orbit, a deep pit. A number of dermal flaps are present.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, parietal and nuchals present, strong, covered with thick skin. *Coronal spines absent.*
Parietal ridges—Strong, composed of equally long parietal and nuchal spines.
The five preopercular spines—Strong, covered with thick skin, the uppermost the longest; radially-directed, with dermal flaps usually present at bases of lowermost spines.
The two opercular spines—Strong, both with ridge extending to base.
Supracleithral and cleithral spines—Both present, the former small.
Lower margin of suborbital bone—With three, occasionally four, strong spines, covered with thick skin; a short dermal flap between bases of the two anterior spines, a longer flap at base of the longer, posterior spine.
Lower posterior edge of gill cover—Without spines.
Symphyseal knob—A low, downward-projecting knob is present.
Raised patch of teeth on tip of lower jaw—Absent.
End of maxillary—Under rear of pupil to rear of orbit.
Maxillaries—Without scales.
Mandibles—Without scales.
Branchiostegals—Without scales.
Ends of pectoral and ventral fins—Ends of ventrals about to front of anus; ends of pectorals to mid or rear of anus.
Second anal fin spine—Usually twice as thick as third. Tip of second extends about to tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Slightly convex.
Terminal profile of anal fin—Convex (rounded).

Scorpaena guttata Girard 1854

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.3 – 2.5	--- ---	--- ---
Depth of body at origin of ventral fins	3.0 – 3.3	1.3 – 1.4	3.0 – 3.6
Depth of body at origin of anal fin	4.1 – 4.5	1.7 – 1.8	2.2 – 2.6
Length of base of anal fin	6.0 – 7.1	2.5 – 3.1	1.5 – 1.7
Length of snout	8.5 – 9.6	3.6 – 3.9	1.0 – 1.3
Width of orbit	9.5 –10.7	3.9 – 4.6	--- ---
Width of interorbital space	--- ---	6.7 – 7.7	0.6
Width of suborbital bone	--- ---	--- ---	0.3 – 0.5
Length of upper jaw	4.6 – 5.1	2.0 – 2.1	1.9 – 2.2
Amount that lower jaw projects	--- ---	--- ---	0.0
Thickness of body	--- ---	--- ---	2.2 – 2.5
Width of base of pectoral fin	--- ---	--- ---	1.3 – 1.4
Longest pectoral fin ray	3.2 – 3.6	1.4 – 1.5	2.7 – 3.3
Longest ventral fin ray	--- ---	1.8 – 2.0	2.1 – 2.4
Length of ventral fin spine	--- ---	2.7 – 3.2	1.4 – 1.6
Length of first anal fin spine	--- ---	--- ---	0.8 – 1.1
Length of second anal fin spine	5.5 – 6.8	2.3 – 3.0	1.6 – 1.9
Length of third anal fin spine	--- ---	--- ---	1.4 – 1.6
Longest anal fin ray	4.8 – 5.4	2.0 – 2.2	1.8 – 2.2
Longest dorsal fin spine	5.4 – 5.5	2.2 – 2.4	1.7 – 2.0
Longest dorsal fin ray	5.4 – 5.9	2.3 – 2.4	1.7 – 2.0
Least depth of caudal peduncle	9.3 –10.2	3.9 – 4.2	0.9 – 1.1
Ventral length of caudal peduncle	--- ---	2.2 – 2.7	1.6 – 1.9
Dorsal length of caudal peduncle	--- ---	3.0 – 3.4	1.2 – 1.4
Posterior of anus to origin of anal fin	--- ---	--- ---	0.6 – 0.7
Longest raker on first gill arch	--- ---	--- ---	0.2

Number of rays in dorsal fin	9 or 10 (occas. 8)
Number of rays in anal fin	5 (occas. 6)
Number of rays in each pectoral fin	18 or 19 (occas. 17)
Unbranched rays in each pectoral fin	7–12
Number of rakers on first gill arch	16–17
Number of pores in lateral line	24–26
Diagonal rows of scales below lateral line	37–42

Number of specimens examined	6, plus 3
Size of specimens examined	7.5–12.2 inches

OTHER COMMON NAMES

Scorpion, scorpionfish

ATYPICAL SPECIMENS

COLOR ABNORMALITIES

A 16-inch flag rockfish, *Sebastodes rubrivinctus,* taken January 9, 1950 in 50 fathoms of water off Pt. Pinos, Monterey Bay, by Mr. Virgil Meloy, was strikingly aberrant in color and possessed a "cancerous" condition of the skin (Figure 58). In flag rockfish of this size the normal color is a light pink background with several bright red bars across the body. In this specimen the bars were a bright lemon-yellow, interspersed with several blotches of jet-black. Also, the skin where the bars occurred was noticeably thickened and roughened. The basic color of the body between the bars was whitish-pink, with a few spots of dark red. In addition to the thickened and roughened condition of the skin where the colored bars occurred, there were a number of small tumors on

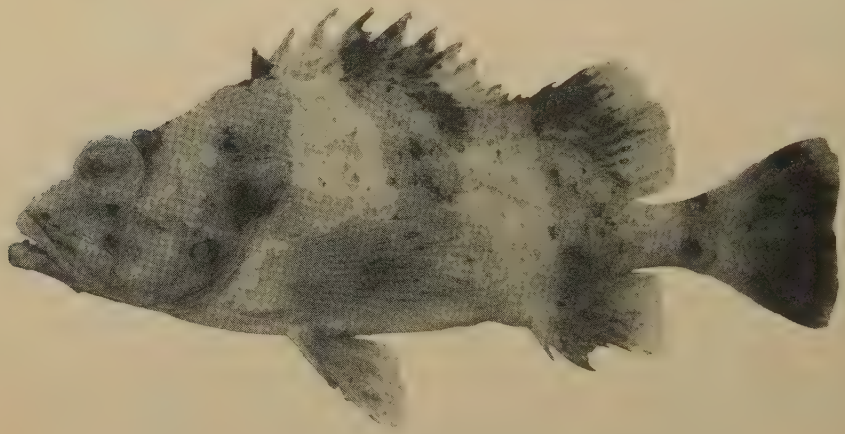

FIGURE 58. Aberrant color and skin tumors on the flag rockfish, *Sebastodes rubrivinctus.*

other parts of the body; one at the posterior margin of one of the orbits, one on top of the back, and one at the base of one of the ventral fins. The color aberrance in this specimen was probably associated with this "cancerous" condition.

A 22½-inch bocaccio, *Sebastodes paucispinis,* taken May 7, 1956 near San Clemente Island, California, was essentially piebald in color. The body was mottled with dark and light gray, with the darker color predominating on the back. The ventral surface and the lowermost fins were washed with light orange. Three adults, taken off Monterey, were an orange-yellow color over the entire body, with just a trace of duskiness on the back. The color of a normal adult bocaccio is olive-brown dorsally and light red on the sides.

One adult vermillion rockfish, *Sebastodes miniatus,* taken off Monterey, was an orange color over the entire body, with a few scattered blackish blotches. The color of normal adults of this species is a dark red, mottled with gray.

A 20-inch widow rockfish, *Sebastodes entomelas,* taken February 8, 1956 in 85 fathoms in Monterey Bay, was a golden-yellow with a trace of duskiness on the back and several small jet-black blotches on the nape. The color of normal adults is a dark grayish-brown.

A melanistic tendency has been noted in several species of rockfish, primarily in adults of some species that inhabit the deeper, offshore waters. Melanism takes the form of jet-black blotches that occur anywhere on the body. This condition has been noted in occasional specimens of bocaccio, *Sebastodes paucispinis;* canary rockfish, *S. pinniger;* Pacific Ocean perch, *S. alutus;* dark-blotched rockfish, *S. crameri;* green-striped rockfish, *S. edongatus;* flag rockfish, *S. rubrivinctus;* and rough-eye rockfish, *S. aleutianus.* It is quite likely that this condition is occasionally present in other species found in deep water. This melanistic tendency should not be confused with the normal and consistently-placed bars and dusky to black blotches that form characteristic patterns on the bodies of certain species of rockfish; nor are the few species in which the mouth and gill cavities are consistently blotched with varying amounts of black included in the type of melanism described above.

Whitebelly rockfish, *Sebastodes vexillaris* and copper rockfish, *S. caurinus* undergo the most noticeable normal color change of perhaps any rockfish. Freshly-caught they are usually milky-white on the clear portions of the lower sides, but these parts becoming suffused with copper-pink or light brown after rigor mortis sets in.

MERISTIC ABNORMALITIES

During the course of processing about 750 specimens of *Sebastodes* from Californian waters, a number of abnormalities were noted in dorsal and anal fin spine counts.

One specimen had 11, four had 12, six had 14 and one 15 dorsal fin spines. All 12 of these variations from the normal 13 dorsal spines occurred in different species (*Sebastodes paucispinis, S. flavidus, S. diploproa, S. alutus, S. jordani, S. zacentrus, S. pinniger, S. ovalis, S. ruber, S. caurinus, S. eos* and *S. rhodochloris* *). In the case where 15 dorsal fin spines were present, two were joined to the same base. In one instance where 14 spines were present, two were joined to the same base, while on another occasion the extra spine was present only in the upper one-half of the membrane and had no basal portion. In the fish that had only 11 spines the deficiency was compensated by two more dorsal fin rays than usually are present in that species. One specimen of *Sebastodes* was encountered with a dorsal fin spine count of only nine, but scar tissue indicated damage, early in life, to the spinous anterior portion of the fin.

Two rockfish were found with four anal fin spines instead of the normal three. One of these was a shortbelly rockfish, *S. jordani,* 11 inches long, taken off Monterey; and the other a dark-blotched rockfish, *S. crameri,* 15½ inches long from off Eureka.

* Carl L. Hubbs (1916) noted 14 dorsal fin spines in a specimen of *Sebastodes elongatus* collected in the San Diego markets. Also, he observed 14 dorsal spines in one of the types of *S. serranoides* in the collection of the British Museum (personal communication).

PHYSICAL ABNORMALITIES

A 23-inch bocaccio taken March 31, 1937, off Monterey had the paired ventral fins missing. Normal skin and scales covered the area where they should have been inserted. A slight lump on the left side was the only visible trace of the missing fins.

A snub-nose condition was found in a widow rockfish, *Sebastodes entomelas*, 10½ inches long; a yellowtail rockfish, *S. flavidus*, 14½ inches long; and in a bocaccio, *S. paucispinis*, 23¼ inches long, all were caught off Monterey. In all three the snout was noticeably fore-shortened (Figure 59).

FIGURE 59. Snub-nose condition in the widow rockfish, *Sebastodes entomelas*.

HYBRIDS

Three atypical forms belonging to the genus *Sebastodes* have been encountered over a period of years. These three forms have tentatively been designated as Hybrids A, B and C. Photographs and descriptions are presented on the following pages. If additional specimens are found in the future, they may prove to be valid species or subspecies.

Hybrid A (Figure 60) has most of the characters by which *S. aurora* is identified and could be considered an extreme variation of *aurora*, except that it differs in one important primary character. The total gill raker count is 36 compared to a range in counts of 24-28 for 16 specimens of the aurora rockfish. Jordan and Evermann (1898) list a total gill raker count for this species as 24-25 including tubercles. If Hybrid A is a cross, the most likely parents would be *S. aurora* and *S. diploproa*. Most of the characteristics are associated with the former, but the gill raker count and two secondary characters (the shape of the suborbital spines and the presence of spines on the posterior edge of the gill cover) are associated with the latter. These two species are quite similar, of comparable size, and as adult fish are found at about the same depths.

The characters of Hybrid B (Figure 61) are not as closely associated with any one species as is the case with Hybrid A. If this form is a cross, the most likely parents might be *S. ovalis* and *S. hopkinsi* which are generally similar, of comparable size, and found at about the same depths as adults.

Although Hybrid C (Figure 62) has most of the characters by which *S. rubrivinctus* is identified and possibly could be considered an extreme variant of it (the flag rockfish), the following secondary characters are incongruous: mandible covered with scales, instead of naked or only with a patch or two; and bars on sides of body blackish-red, instead of bright red. Unfortunately, most of the gill arches were torn out when the fish was caught, thus preventing a comparison of the total raker count. If this form is the result of a cross, *S. rubrivinctus* and *S. crameri* might be considered as likely parents, with most of the characters associated with the former. *S. rubrivinctus,* in itself, is quite variable in some respects: the top of the head, between the orbits, varies from nearly flat to deeply concave; and the color of the peritoneum varies from white to black, with no apparent correlation with length of fish. Also, an extremely unusual color aberrance and "cancerous" skin has been noted in a flag rockfish (see "Color aberrance," p. 138, and Figure 58).

Although hybridization between similar species of marine fish is not common, it is not improbable between certain species in the genus *Sebastodes* considering the coexistence of a number of species at different depths of water. In fact, it is surprising that hybridization in this genus is so uncommon since it is not uncommon in related species of fresh water fish. Hubbs (1955) has analyzed and fully discussed the subject of hybridization between fish species in nature, and has conducted some interesting experiments in cross-fertilization.

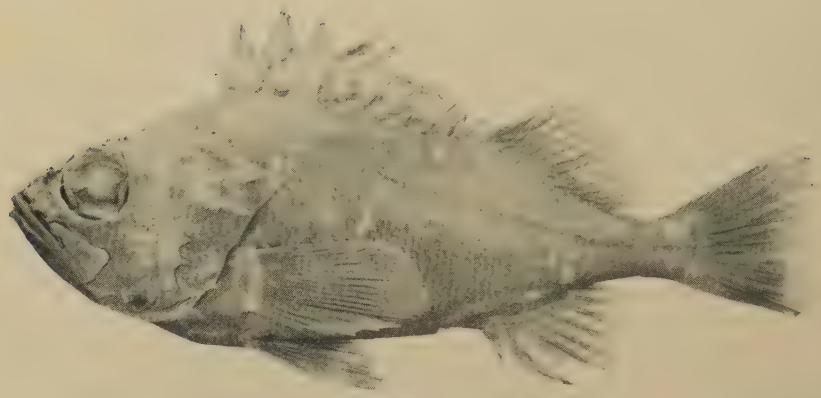

FIGURE 60

HYBRID A

Locality, size and date collected—Monterey Bay, California; 12½ inches. (May 26, 1939)
Body color—Uniformly pink.
Mouth and gill cavities—Pink or white.
Peritoneum—Jet black.
Top of head, at mid-orbits—Deeply concave with a median groove between a pair of low frontal ridges.
Spines on top of head—Nasal, preocular, supraocular, postocular, tympanic, coronal and nuchals present, strong and sharp. (The supraocular spine is double on one side.)
Parietal ridges—Moderately high and thin.
The five preopercular spines—Strong and sharp, the upper two directed backward, the lower three radially-directed.
The two opercular spines—Long, thin and sharp.
Supracleithral and cleithral spines—Strong.
Lower margin of suborbital bone—Two, strong, sharp spines present. The anterior divided into two and three points.
Lower posterior edge of gill cover—Spines present.
Symphyseal knob—A small, downward-projecting knob present.
Raised patch of teeth on tip of lower jaw—A strongly raised patch present.
End of maxillary—Under rear of pupil.
Maxillaries—An elongate patch of scales present.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals, reaching anus.
Second anal fin spine—Only slightly thicker than third. Tip of second reaches about one-eighth orbit width beyond tip of third.
Spinous dorsal fin—Moderately incised.
Posterior profile of caudal fin—Slightly indented.
Terminal profile of anal fin—Slightly convex (rounded).

Hybrid A

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.4	---	---
Depth of body at origin of ventral fins	2.7	1.1	3.4
Depth of body at origin of anal fin	4.0	1.6	2.2
Length of base of anal fin	6.9	2.8	1.3
Length of snout	11.3	4.6	0.8
Width of orbit	9.0	3.7	---
Width of interorbital space	---	5.3	0.7
Width of suborbital bone	---	---	0.2
Length of upper jaw	5.2	2.1	1.7
Amount that lower jaw projects	---	---	0.0
Thickness of body	---	---	1.6
Width of base of pectoral fin	---	---	0.8
Longest pectoral fin ray	3.7	1.5	2.4
Longest ventral fin ray	---	2.5	1.5
Length of ventral fin spine	---	2.7?	1.4?
Length of first anal fin spine	---	---	---
Length of second anal fin spine	6.2	2.5	1.5
Length of third anal fin spine	---	---	1.2
Longest anal fin ray	5.8	2.4	1.6
Longest dorsal fin spine	---	---	---
Longest dorsal fin ray	---	---	---
Least depth of caudal peduncle	11.1	4.5	0.8
Ventral length of caudal peduncle	---	2.1	1.7
Dorsal length of caudal peduncle	---	2.9	1.3
Posterior of anus to origin of anal fin	---	---	0.4
Longest raker on first gill arch	---	---	0.6

Number of rays in dorsal fin	13
Number of rays in anal fin	6
Number of rays in each pectoral fin	18
Unbranched rays in each pectoral fin	7
Number of rakers on first gill arch	36
Number of pores in lateral line	29
Diagonal rows of scales below lateral line	44

Number of specimens examined	1
Size of specimens examined	12.5 inches

FIGURE 61

HYBRID B

Locality, size and date collected—Monterey Bay, California; 8¾ inches. (March 18, 1939)
Body color—Light-brown, with dusky blotching on back; fins with black on margins.
Mouth and gill cavities—Pink and white; a black blotch on underside of opercle.
Peritoneum—Jet-black.
Top of head, at mid-orbits—Slightly convex (elevated).
Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, moderately strong, sharp (the tympanics are small and close to the postoculars). *Supraocular, coronal and nuchal spines absent.*
Parietal ridges—Low and thin.
The five preopercular spines—Sharp, the second and third from top the largest; most rather posteriorly-directed.
The two opercular spines—Moderately strong, sharp.
Supracleithral and cleithral spines—Supracleithral small, sharp; cleithral strong, triangular.
Lower margin of suborbital bone—Two, low, rounded lobes present, with a small spine on rearmost lobe.
Lower posterior edge of gill cover—Spines absent.
Symphyseal knob—A slight knob is present.
Raised patch of teeth on tip of lower jaw—A slight elevation is present but not a distinctly raised patch of teeth.
End of maxillary—Under mid-orbit.
Maxillaries—Covered with scales.
Mandibles—Covered with scales.
Branchiostegals—With scales.
Ends of pectoral and ventral fins—Tips of pectorals extend slightly beyond tips of ventrals, reaching to anus.
Second anal fin spine—Nearly twice as thick as third. Tip of second reaches tip of third (spines depressed).
Spinous dorsal fin membrane—Moderately incised.
Posterior profile of caudal fin—Strongly indented.
Terminal profile of anal fin—With a strong posterior slant.

Hybrid B

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.9	---	---
Depth of body at origin of ventral fins	3.0	1.0	3.1
Depth of body at origin of anal fin	3.7	1.3	2.5
Length of base of anal fin	5.5	1.9	1.7
Length of snout	11.8	4.2	0.8
Width of orbit	9.4	3.3	---
Width of interorbital space	---	3.8	0.9
Width of suborbital bone	---	---	0.1
Length of upper jaw	6.8	2.4	1.4
Amount that lower jaw projects	---	---	0.1
Thickness of body	---	---	1.4
Width of base of pectoral fin	---	---	0.9
Longest pectoral fin ray	4.7	1.7	2.0
Longest ventral fin ray	---	1.8	1.8
Length of ventral fin spine	---	2.4	1.4
Length of first anal fin spine	---	---	0.6
Length of second anal fin spine	7.1	2.5	1.3
Length of third anal fin spine	---	---	1.2
Longest anal fin ray	6.8	2.4	1.4
Longest dorsal fin spine	8.8	3.1	1.1
Longest dorsal fin ray	7.7	2.7	1.2
Least depth of caudal peduncle	11.6	4.1	0.8
Ventral length of caudal peduncle	---	1.8	1.8
Dorsal length of caudal peduncle	---	2.6	1.3
Posterior of anus to origin of anal fin	---	---	0.3
Longest raker on first gill arch	---	---	0.4

Number of rays in dorsal fin	14
Number of rays in anal fin	8
Number of rays in each pectoral fin	18–19
Unbranched rays in each pectoral fin	8–9
Number of rakers on first gill arch	34
Number of pores in lateral line	49
Diagonal rows of scales below lateral line	62

Number of specimens examined	1
Size of specimens examined	8.7 inches

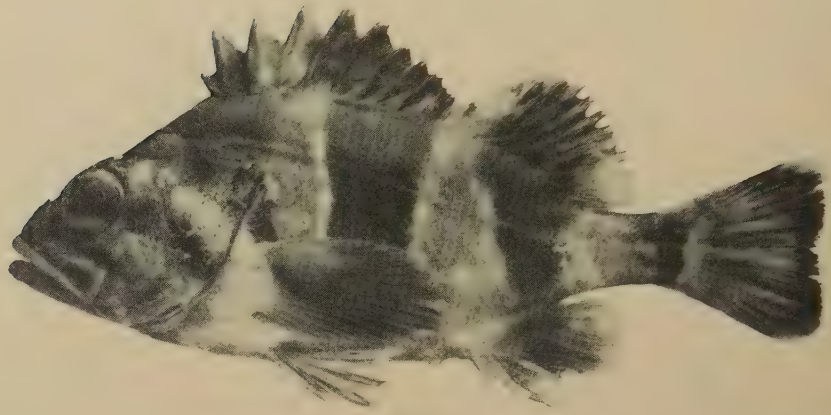

FIGURE 62

HYBRID C

Locality, size and date collected—Monterey Bay, California; 11½ inches. (June 28, 1939)

Body color—Light red with several broad, vertical dark red bars on body. These bars are in the same positions as those found in *S. rubrivinctus* (Fig. 35).

Mouth and gill cavities—Pinkish-white, a black splotch on underside of opercle.

Peritoneum—Black.

Top of head, at mid-orbits—Deeply concave, with a median groove bordered by vague frontal ridges.

Spines on top of head—Nasal, preocular, postocular, tympanic and parietals present, moderately strong and rather prostrate. *Supraocular, coronal and nuchal spines absent.*

Parietal ridges—Moderately high, rounded.

The five preopercular spines—Moderately strong, sharp, the upper two longer and directed backward, the lower three directed rather downward.

The two opercular spines—Moderately long and sharp.

Supracleithral and cleithral spines—Supracleithral small; cleithral large and triangular.

Lower margin of suborbital bone—Two large, sharply triangular spines present (the anterior spine is double on one side).

Lower posterior edge of gill cover—Spines absent.

Symphyseal knob—A low, rounded, downward-projecting knob present.

Raised patch of teeth on tip of lower jaw—Absent.

End of maxillary—Under rear of pupil.

Maxillaries—Covered with scales.

Mandibles—Covered with scales.

Branchiostegals—With scales.

Ends of pectoral and ventral fins—Tips of pectorals extend beyond tips of ventrals by about one-half of orbit width, reaching rear of anus.

Second anal fin spine—Nearly three times as thick as third. Tip of second extends to tip of third (spines depressed).

Spinous dorsal fin membrane—Moderately incised.

Posterior profile of caudal fin—Slightly indented.

Terminal profile of anal fin—Slightly convex.

Hybrid C

Measurement	Frequency of measurement into:		Frequency of orbit width into measurement
	Standard length	Head length	
Length of head	2.5	---	---
Depth of body at origin of ventral fins	2.6	1.0	3.5
Depth of body at origin of anal fin	3.3	1.3	2.7
Length of base of anal fin	6.6	2.7	1.4
Length of snout	9.9	4.0	0.9
Width of orbit	9.0	3.7	---
Width of interorbital space	---	6.3	0.6
Width of suborbital bone	---	---	0.2
Length of upper jaw	5.3	2.1	1.7
Amount that lower jaw projects	---	---	0.0
Thickness of body	---	---	1.7
Width of base of pectoral fin	---	---	0.9
Longest pectoral fin ray	3.5	1.4	2.6
Longest ventral fin ray	---	2.0	1.8
Length of ventral fin spine	---	2.9	1.2
Length of first anal fin spine	---	---	0.6
Length of second anal fin spine	6.3	2.6	1.4
Length of third anal fin spine	---	---	1.1
Longest anal fin ray	---	---	---
Longest dorsal fin spine	6.2?	2.5?	1.5?
Longest dorsal fin ray	---	---	---
Least depth of caudal peduncle	9.8	4.0	0.9
Ventral length of caudal peduncle	---	1.9	1.9
Dorsal length of caudal peduncle	---	2.7	1.3
Posterior of anus to origin of anal fin	---	---	0.3
Longest raker on first gill arch	---	---	---

Number of rays in dorsal fin	13
Number of rays in anal fin	7
Number of rays in each pectoral fin	19
Unbranched rays in each pectoral fin	8–9
Number of rakers on first gill arch	---
Number of pores in lateral line	42
Diagonal rows of scales below lateral line	54

Number of specimens examined	1
Size of specimens examined	11.5 inches

FIGURE 63

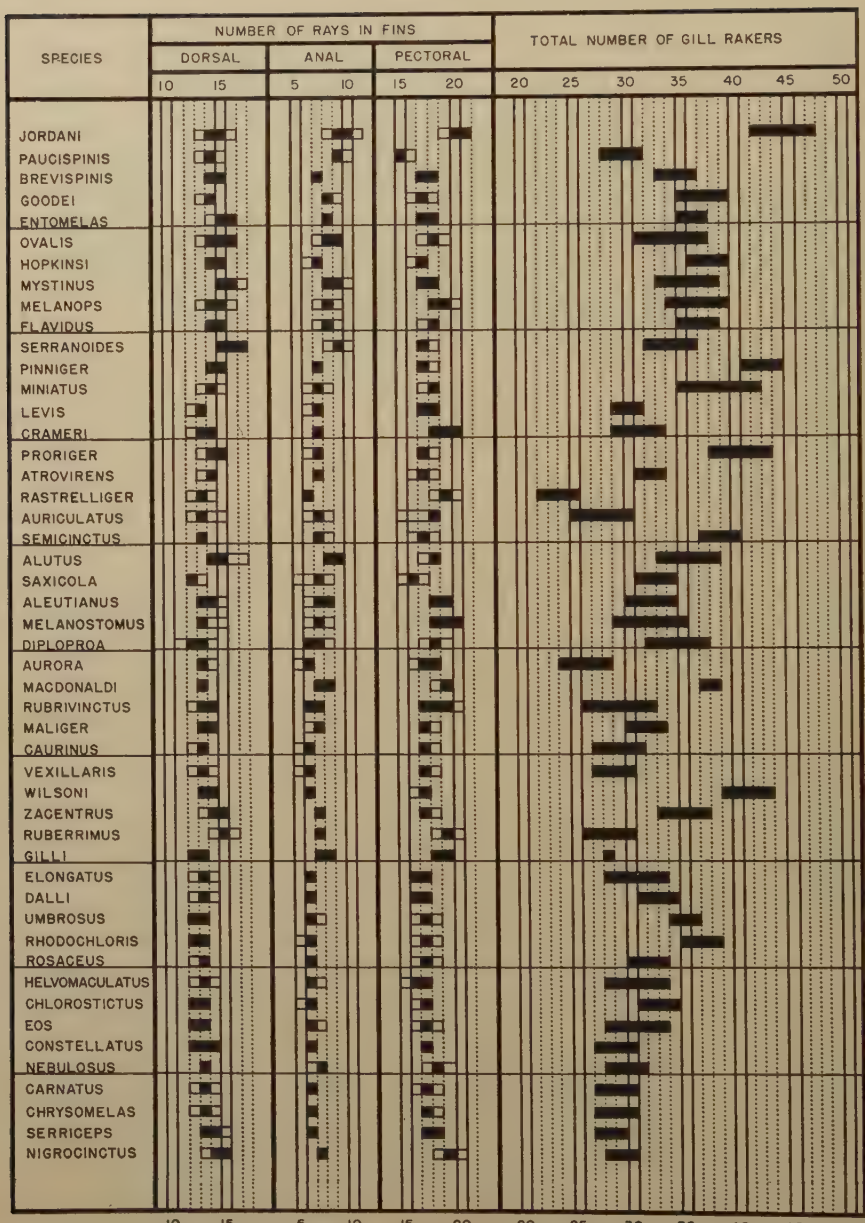

FIGURE 63. Frequency of number of rays in dorsal, anal, and pectoral fins, and total number of rakers on first gill arch, for the species of *Sebastodes* known from California waters.

FIGURE 64

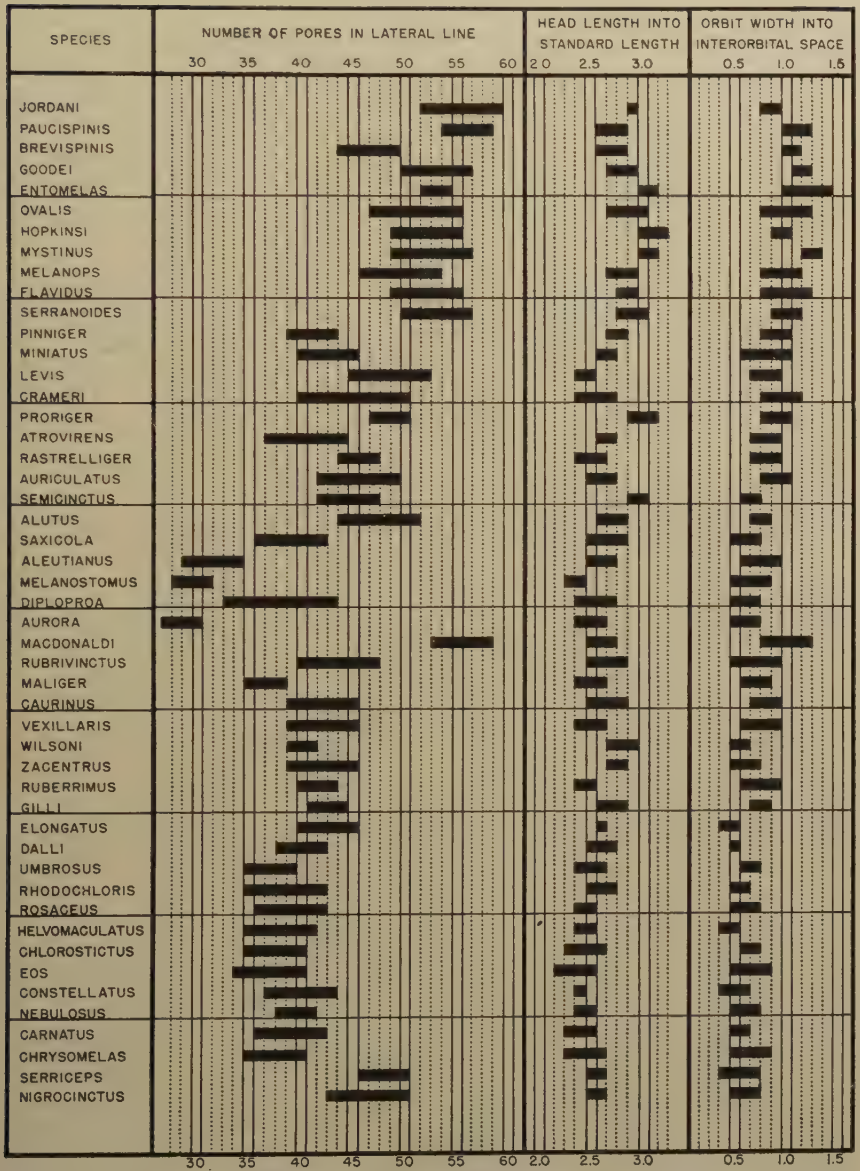

FIGURE 64. Frequency of number of pores in lateral line, head length into standard length, and orbit width into bony interorbital space, for the species of *Sebastodes* known from California waters.

FIGURE 65

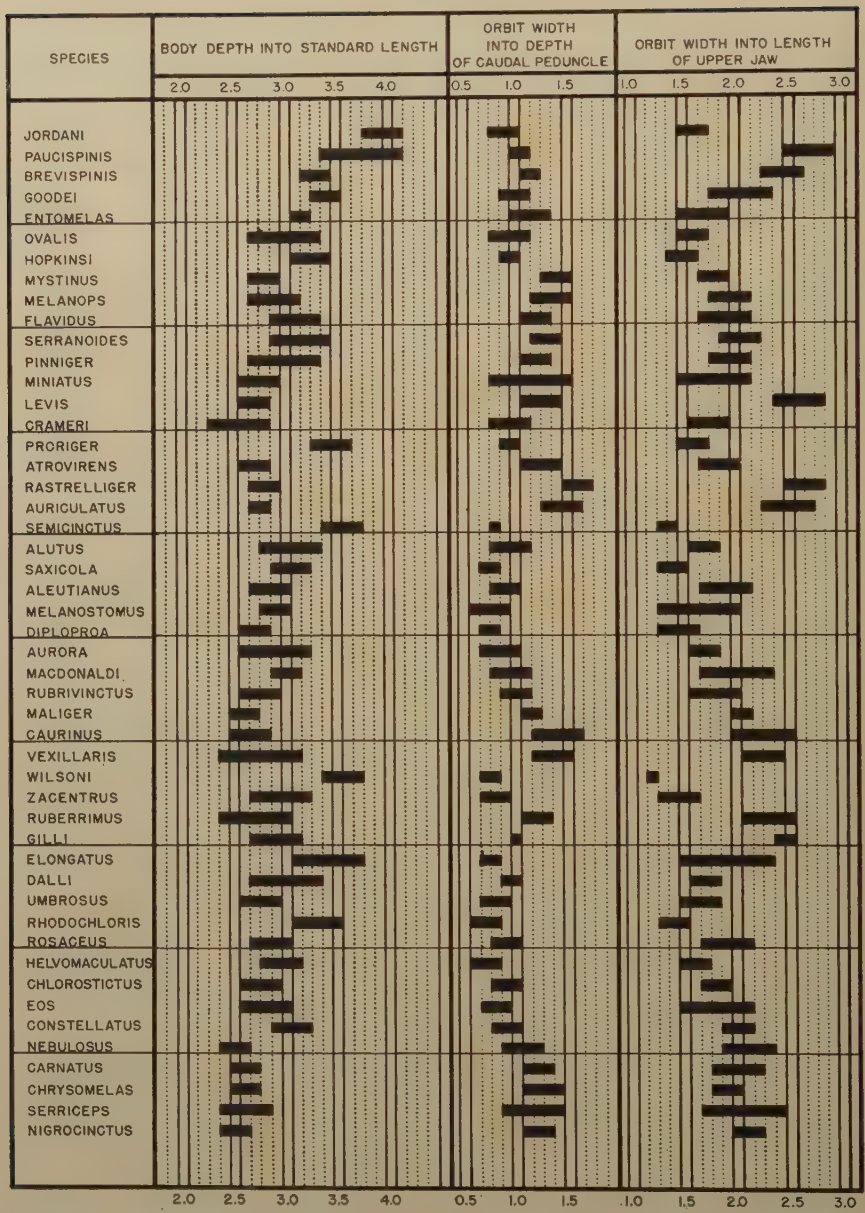

FIGURE 65. Frequency of body depth into standard length, orbit width into depth of caudal peduncle, and orbit width into the length of the upper jaw, for the species of *Sebastodes* known from California waters.

FIGURE 66

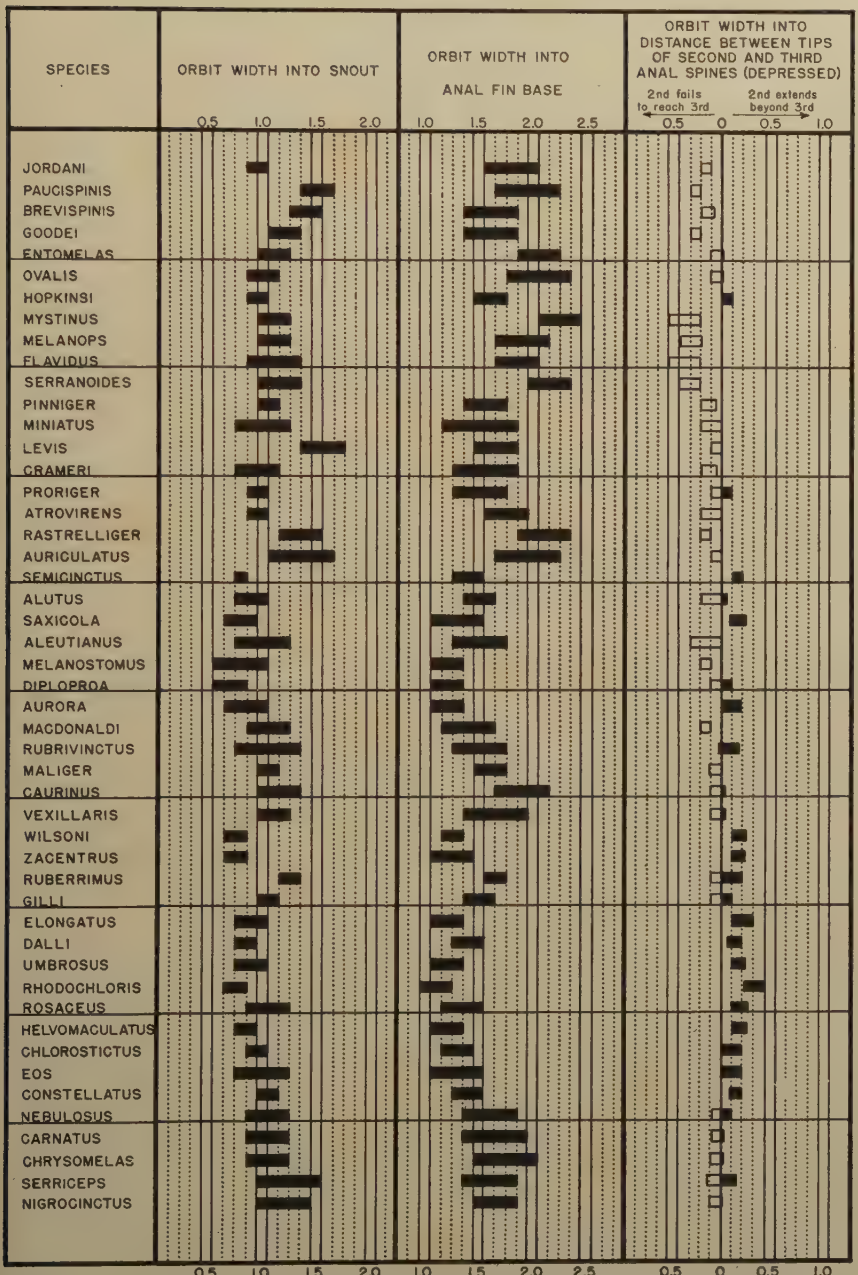

FIGURE 66. Frequency of orbit width into snout, into anal fin base, and into space between tips of second and third anal fin spines with spines depressed, for the species of *Sebastodes* known from California waters.

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